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ROADS AND STREETS

DECEMBER 1947

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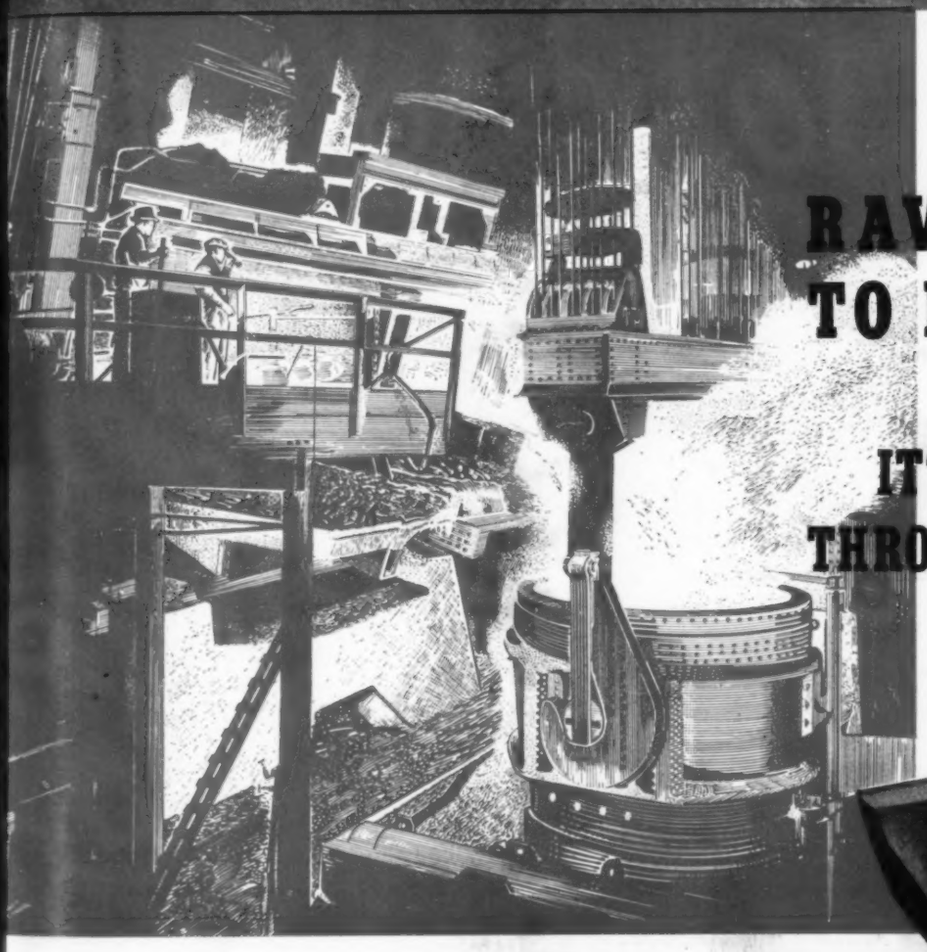


FROM RAW MATERIAL TO FINISHED BIT

IT'S TIMKEN® THROUGH AND THROUGH

Every ounce of steel that goes into Timken Rock Bits comes from Timken furnaces and is constantly under the control of Timken metallurgists. Developed as a direct result of our long specialized experience in steel manufacture and treatment it is the finest material ever produced for removable rock bits and is basically responsible for the outstanding performance, endurance and economy of Timken Bits in all kinds of rock.

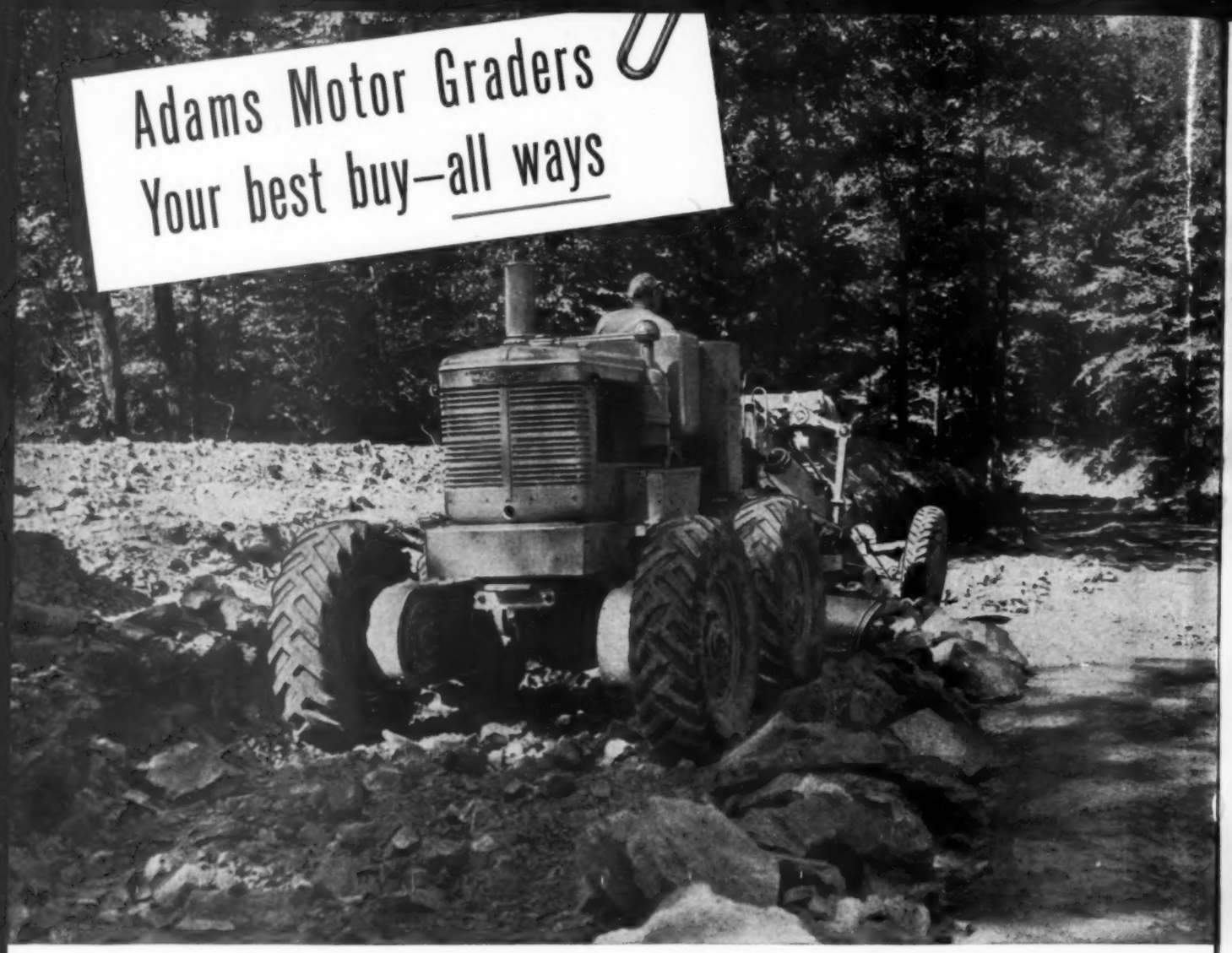
Only in Timken Bits can you have the advantages of Timken steel plus Timken scientific design and precision manufacturing practice. We'll be glad to run tests under your operating conditions at any time.

THE TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

ROCK BITS



Built Stronger to Last Longer

★ You don't have to worry about those rough, tough, grading jobs—not when you have an Adams Motor Grader on the job.

Adams Motor Graders are built with a big, extra measure of strength and stamina, through and through. They've got everything it takes for handling punishing jobs—for punching shale out of hillsides—making heavy ditch and bank cuts—scarifying hard surface material—bucking through deep snow drifts, etc.

Yet, for all their great strength and stamina, Adams Motor Graders are not bulky or overweight. Theirs is the hard, lean strength of a trained athlete—free of all excess weight. That's why Adams Graders are so economical to operate and maintain—why they can be depended on to deliver efficient, reliable service, year after long year.

See your local Adams dealer. Let him show you why Adams Motor Graders are *Your Best Buy—All Ways.*

J. D. ADAMS MANUFACTURING CO. • INDIANAPOLIS, INDIANA

Adams

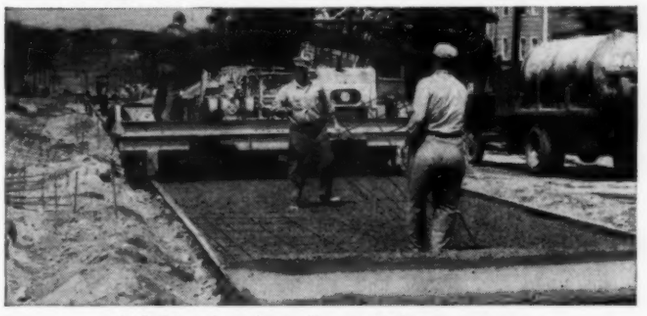
Motor Graders
Elevating Graders
Leaning Wheel Graders

Turnpike in Massachusetts GETS FACE-LIFTING

Wetting down subgrade prior to initial pour of concrete in fourth lane.

Officials on the job. Left to right: Charles B. Teague and Robert S. MacEachern, both of Massachusetts Department of Public Works, with (at right) A. Soma, Superintendent for B. Perini & Sons, Inc.

Paving in progress. As paver prepares to gulp new load, strike-off spreads first layer of concrete.



A slight push and over it goes. Only two men are needed to place Bethlehem Hinged Bar Mats.

Finished roadway begins to take shape. Here bar mats are in place and final course is being struck off.

Because it is no longer a match for the heavy traffic encountered in northeastern Massachusetts, the 30-mile-long Newburyport Turnpike, famous route from Boston to Maine and Canada, is gradually being relocated and widened into a four-lane, divided highway.

These pictures, taken north of Lynnfield, show recent construction along two adjoining stretches of the new road. Each stretch is approximately a mile in length. One is being built by B. Perini & Sons, Inc., Framingham, Mass., the other by B. A. Simeone, Inc., Medford, Mass. Hinged bar mats, road joints, dowels, cable guard rail and steel posts were furnished by Bethlehem.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

STEEL FOR HIGHWAYS

Road Joints • Reinforcing Bars • Bar Mats • Guard Rail
Tie-Rods • Guard Rail Posts and Brackets • Spikes
Wire Rope and Strand • Hollow Drill Steel
Fabricated Structural Steel • Bolts and Nuts
Sheet and H-Piling • Timber Bridge Hardware

BETHLEHEM STEEL

ROADS AND STREETS

DECEMBER, 1947 ● VOL. 90 ● No. 12

With Roads and Streets Have Been Combined Good Roads Magazine And Engineering & Contracting

Coming Articles

67-Mile Hot-Mix Job

Five contract sections radiating out from Tallahassee, Fla.—"nice biz" nicely handled by one of the South's leading contractors. Interesting pix and "how" information

200-ton Super Compactor

Yes, believe it or not, 200 tons! On four rubber tires. One of many noteworthy details in the grading of Baltimore's new airport, now nearing completion

Robot Traffic Cop

Details of a unique traffic-actuated signal system for one of the world's busiest intersections, as described by an engineer in the New Jersey highway department

Pre-Qualification of Contractors

Contractors and engineers will want to read this discussion of one state's practice

Highway Research Board

Annual meeting summary—quick highlights and summaries of papers, for the benefit of the many who were not able to attend the recent Washington, D. C., session

Bridges and More Bridges

Several project reports, covering both design details and contractor methods

A Look-See at '47 (and '48)

It was a big year of highway progress. Watch for summary articles and a forecast or two for '48 programs, trends, developments in field methods

Field kinks . . . Job and Equipment Ideas . . . Equipment Maintenance Ideas . . . and soon we'll be beginning the serialized new book on Soil Stabilization and Compaction. Watch for further announcements

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A magazine devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations, and to the construction and maintenance of airports.

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Publication and Editorial Offices,
22 West Maple Street, Chicago 10, Ill.

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C. T. MURRAY, Managing Editor
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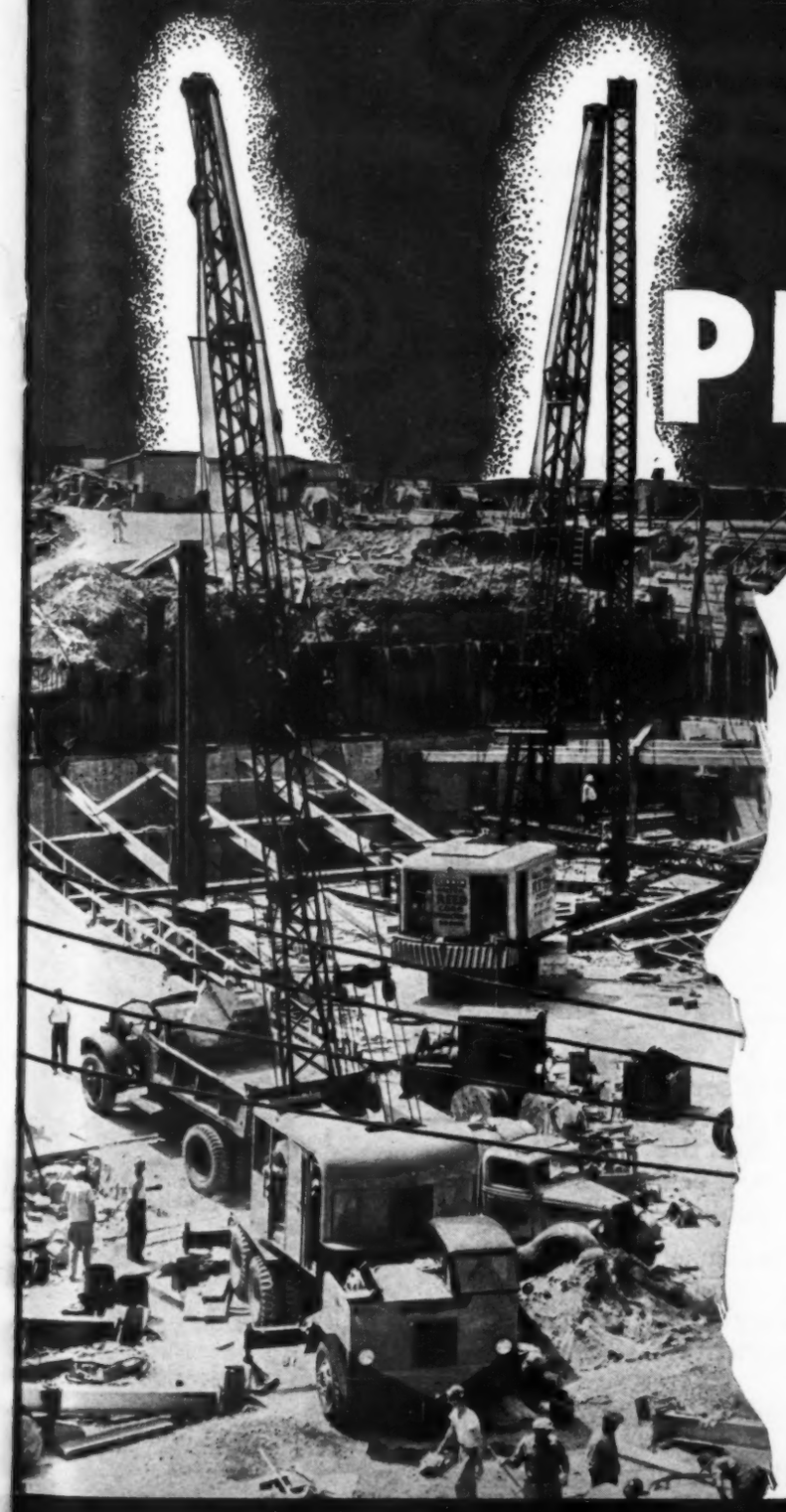
TEAM 'EM UP for PROFIT!



More and more contractors are creating work teams composed of two or more machines from the complete line of Lorain shovels and cranes. Typical example is foundation project for the New England Telephone & Telegraph Co., Boston, Mass. It covers approximately one acre with depth of excavation ranging from 40 to 70 feet. Pictured in background is one of five larger Lorains used for heavy-duty service by the Walter Reed Corp. In the foreground you see a highly mobile Moto-Crane of Thompson & Dobbins which insures fast handling of the scattered, miscellaneous jobs.

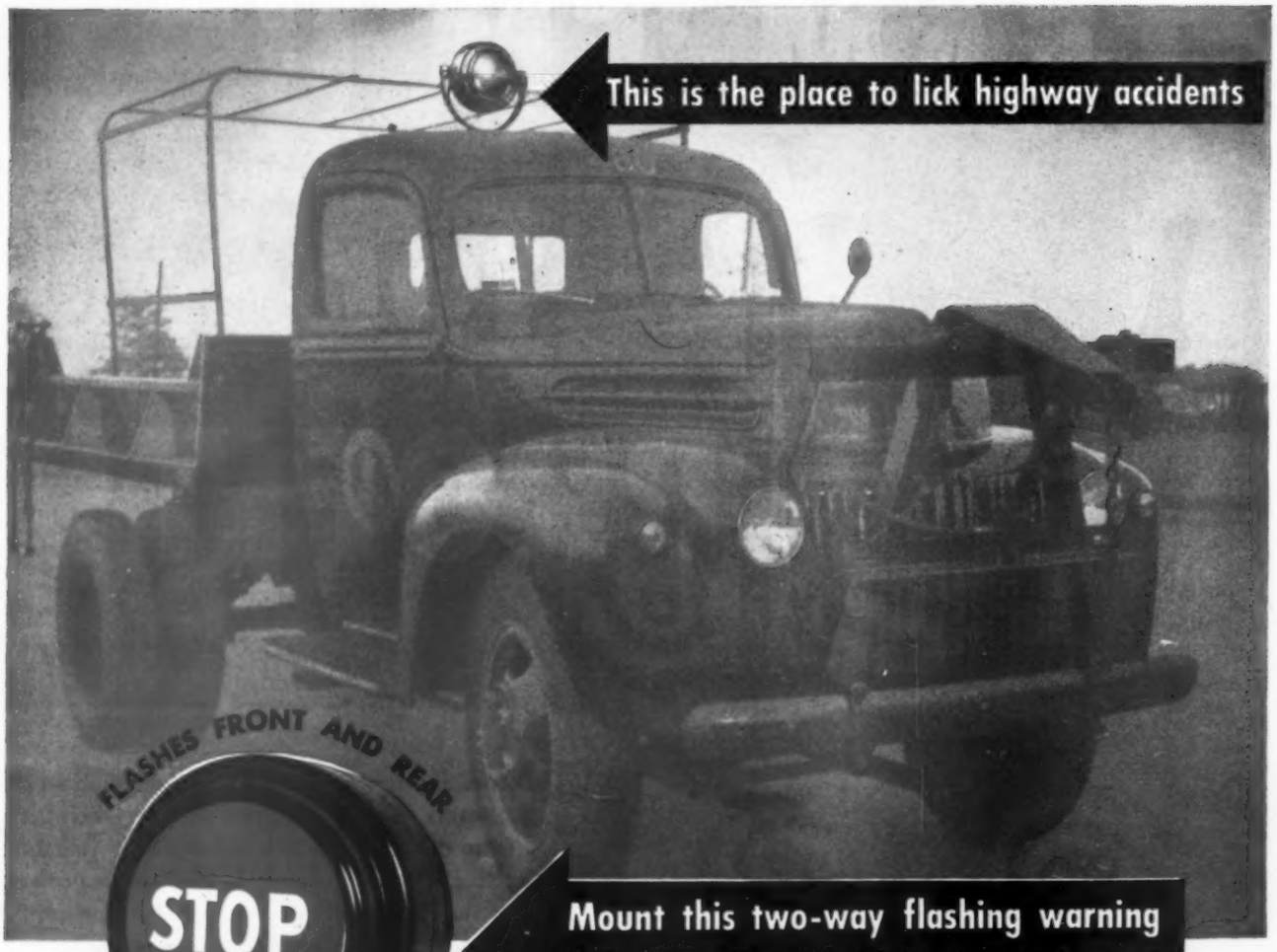
Crawler shovels ranging in capacity from ½ to 2 yd. classes, plus a complete selection of 4 and 6 wheel rubber-tire mounted units in the ½ and ¾ yd. class—that's today's modern Lorain line with all units readily convertible to shovel, crane, clamshell, dragline or hoe operation.

And, no matter what combination of capacity and mobility your work demands, you are assured efficient over-all performance with an all-Lorain team. For complete information, write or call your local Thew-Lorain distributor.

Lorain

THE THEW SHOVEL COMPANY
LORAIN, OHIO

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

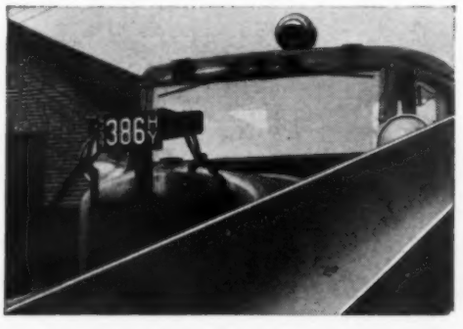

This is the place to lick highway accidents
FLASHES FRONT AND REAR
STOP
Mount this two-way flashing warning light on all your highway equipment

Pat. No. 2,280,275

Heavy-duty lights that won't shake apart. Water can't get in and short them. Mounted anywhere on vehicle. Supplied with 6½" red lenses lettered "STOP," or with plain red, amber or blue lenses for 6 and 12 volt systems.

Flashing action in a warning light is seen and obeyed. Only this Keystone Flashing Light provides it two ways at once, both to front and rear. It does the work of two or more lights at the cost of one. It means safety for your men — the public — and your equipment.

Keystone Flashing Lights have been used successfully for many years by countless cities, counties, townships, park and bridge commissions, state highway departments, public utilities, etc., on all types of vehicles. Write us to send you a light for inspection.
Auto Gear & Parts Co., Inc., 16th St. and Hunting Park Ave., Philadelphia 40, Pa.



KEYSTONE *FLASHING* LIGHT

The "Lighthouse" of the Highway

bought 5 more Jaegers

HERE'S WHY: *This 6 months' operating record of their first 4 compressors is the reason why Bell Compressor Rental Co. now owns 9:*

Total number of jobs done by four Model 105 units..... 503
Average number of hours worked by each..... 745.7
Average gasoline consumption per machine per hour. 1.35 gals.
Cost of repairs and replacements..... None
Frequency of oil change..... 200 hours

Highlights from Mr. Ferrara's Report:

In the rental business, we are interested in low cost operation and upkeep. With other makes in our fleet of the same age and use, gasoline consumption was higher and repairs amounted to over $50 for this same period. We have since added 5 more Jaegers as a result.

From over 15 years experience, I say that the Jaeger is the best. It embodies the most desirable features of all compressors, including a large receiver for steady, even pressure; easy starting; easiest to oil, grease and make adjustments — a very important factor.

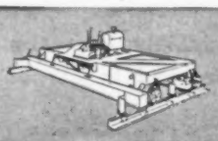
Our customers feel the same way. With a Jaeger they have no delays or breakdowns and accomplish more work. Time and again, our customers ask us to furnish a Jaeger "Air Plus" compressor on their job.

James Ferrara
Bell Compressor Rental Co., Washington, D. C.

Tops in service, too — "AIR PLUS" Compressors, in 60 to 600 ft. sizes, are sold, rented, serviced in 130 cities of the U. S. and Canada. See your Jaeger distributor.

THE JAEGER MACHINE COMPANY, Columbus 16, Ohio

REGIONAL OFFICES — 8 E. 48th St. NEW YORK 17, N. Y. — 226 N. LaSalle St. CHICAGO 1, ILL. — American Life Bldg. BIRMINGHAM 1, ALA.



JAEGER
Spreaders, Finishers

"SPEEDLINE"
Concrete Mixers

"SURE PRIME"
Contractors Pumps

JAEGER *Engineered* **EQUIPMENT**

"DUAL-MIX" TRUCK MIXERS, AGITATORS — HOISTING ENGINES, SELF-RAISING TOWERS — CONCRETE AND BITUMINOUS PAVING EQUIPMENT

HARD HITTERS IN THE WINTER LEAGUE

No longer do blizzards paralyze traffic on highways that are fortified with powerful, quick-on-the-job "Caterpillar" snow-removal equipment. Thus, schools remain open, doctors can meet emergencies, factories and mines keep operating, merchandise and farm products keep flowing, stores keep busy . . . "business as usual" keeps turnover steady, money circulating, profits growing.

Yes, the far-reaching benefits that "Caterpillar" equipment contributes to many a community's progress and prosperity may be hard to sum up in figures, but they are real nevertheless—and usually great. The uses of this versatile equipment are many, its advantages manifold. It can be kept working the year round—on snow removal in winter; on road building and maintenance, ditch cleaning, gravel digging, rubbish disposal and scores of other jobs during the other seasons.

"Caterpillar" Diesel Tractors (track and wheel type) and the matched earthmoving equipment to go with them, Motor Graders, Engines and Electric Sets have a widely recognized superiority—in power, ruggedness, dependability, operating economy, long serviceable life, and in efficient and convenient dealer service.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

VERMONT—"Caterpillar" Diesel D6 Tractor, equipped with V-type hydraulic snow-plow, removing snow from back roads near town of Lowell. Tractor used on road maintenance during summer.

WISCONSIN—"Caterpillar" Diesel D4 Tractor, equipped with Traxcavator, loading snow during 18-inch transport-stalling fall in Milwaukee.

NEW YORK—Two of four "Caterpillar" Diesel DW10 Tractors pulling scrapers removing snow from Syracuse bus-route streets. Snow hauled five blocks or more; dumped on vacant lot.

IDAHO—"Caterpillar" Diesel No. 12 Motor Grader, with snow-plow and snow-wing, clearing snow from roads at 7000 feet elevation (Teton Pass) and below-zero temperatures. Hourly fuel cost approximately 25 cents.

CATERPILLAR DIESEL

ENGINES • TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

UNBEATABLE

EVERYTHING about the International Diesel Crawler Tractor points to just one objective: low-cost, efficient earth moving. Its Diesel engine gives you power that's balanced to the tractor's weight and construction—power that's available instantly, at the push of a button, regardless of weather! Refinements of design, developed through years of field and laboratory work, make the International Diesel Crawler your unbeatable earth mover. Each size delivers maximum effective horsepower to bulldozer or scraper blades, which means more work capacity. This is achieved through proper balance of power, pull, weight and speed. And the International gives you this fine performance at lowest operating and maintenance costs.

Get the whole story of International Diesel Crawler superiority from your International Industrial Power Distributor.

Industrial Power Division

INTERNATIONAL HARVESTER COMPANY

180 North Michigan Avenue • Chicago 1, Illinois

CRAWLER TRACTORS
POWER UNITS
DIESEL ENGINES
WHEEL TRACTORS

INTERNATIONAL

EARTH MOVER

INTERNATIONAL HARVESTER

Industrial Power

FAST Rubber-tired T... speeds to 15 m.p.h.

Backfilling requires shuttle-type dirtmoving. The Tournadozer with its fast forward and reverse speeds plus instantaneous shifting cuts down non-productive dozer time — helps you move more yards per hour.

In Scraper loading, Tournadozer's pushing power plus maneuverability in high speeds, forward or reverse, means more scrapers served per pusher . . . more units loaded per hour. Result: more payloads per day, with fewer men and machines.

Special tapered bead on giant 21.00 x 25 tires prevent tire slipping on rim . . . permit lowering pressure for extra flotation and traction to meet extreme conditions in sand, mud, snow or ice.

Extreme maneuverability makes this dozer ideal for contractor, mine or quarry clean-up. Easy to operate air-actuated driving and braking controls give accurate finishing . . . perfect operator visibility.

Tournadozer—Trademark RR16-R

LET

See your Le Tourneau Distributor NOW for complete information

TOURNADOZER

YES, you can now have a high-speed *rubber-tired* dozer that can go anywhere in a hurry . . . do the job faster when it gets there . . . drive fast job-to-job over pavement, black top, muddy country roads or cross country.

15 m.p.h. . . . forward and REVERSE

The 180 h.p. Model C Tournadozer gives you the high speed operation you've always wanted in a dozer . . . up to 15 m.p.h. in BOTH forward and reverse . . . nearly twice as fast as crawlers.

No gear-shift delay

New constant-mesh transmission in the Tournadozer gives you instant selection of gear ratios anytime . . . without loss of momentum, or stopping to shift gears. Move selector lever to speed you want and air-actuated clutches give it to you RIGHT NOW.

Low center of gravity and wide tire tread assure greater stability . . . short-coupled wheelbase increases maneuverability.

Giant tires give traction, extra flotation in soft going

Four big 21.00 x 25 low-pressure tires assure ample flotation and traction for toughest going . . . no track rollers to lubricate . . . no expensive moving parts to grind and wear in abrasive materials. You roll on rubber instead of steel.

Speed, power, maneuverability make it a versatile tool

This big, fast, rubber-tired dozer is ideal for road construction, maintenance, backfilling, clearing and leveling land, building dams or levees, stripping, bulk material handling, and for pusher service on scraper dirtmoving.

Seeing is believing

Before you buy a slow-moving, high-maintenance dozer, see the new fast-moving, rubber-tired Model C Tournadozer in action. Your LeTourneau Distributor can give you complete information on performance, prices and delivery . . . SEE HIM TODAY.

LETOURNEAU
PEORIA, ILLINOIS

HIGH-SPEED RUBBER-TIRED

TOURNADOZERS

KOEHRING 605 Dragline
stepped up by keeping cable

SAVES ALL 3

Down-Time Cost
Labor Cost
Cable Cost

You save more than cost of wire rope when you prolong drag-cable life. You eliminate down-time, gain extra yardage. You save man-hours, reduce maintenance overhead. All three, down-time cost, labor cost, cable cost, add up to an important part of your overhead — and Koehring 605 cuts down on all three. Koehring 605 patented fairlead eliminates sharp cable bends. Koehring 605 big diameter drums prolong cable life. Koehring 605 power clutches eliminate sudden shock loading of cable.

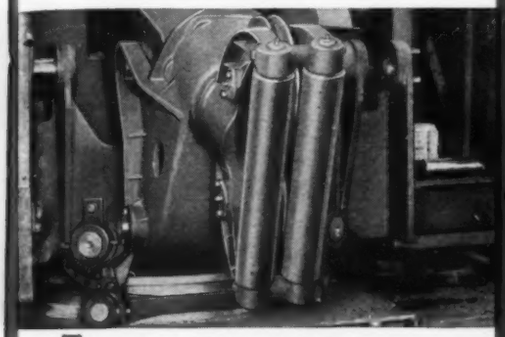
Contact your Koehring distributor today for further details on the Koehring 605. 1½ to 2½ yards as dragline, 1½ yard as shovel, 30-ton crane. Koehring also builds the Koehring 205 (½ yard shovel cap.) and the Koehring 304 (¾ yard shovel cap.).

KOEHRING COMPANY

Profits *cost low*

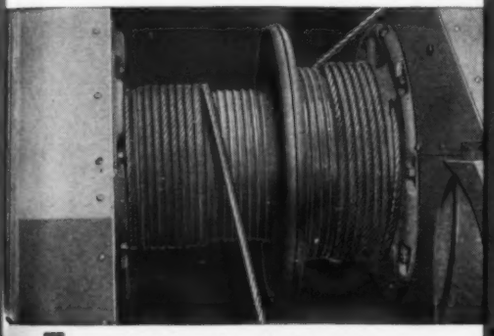
FAIRLEAD SAVES CABLE

With bucket at any angle, Koehring-patented rotating fairlead keeps drag cable running over big 15-inch sheaves. No cable wearing bends. Cable can't jump out.



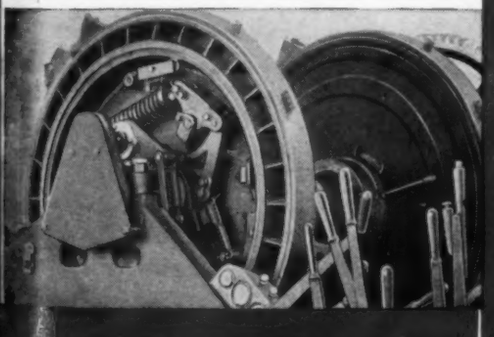
DRUM SAVES CABLE

Slack cable hugs drum grooving because drag cable spools over top of drum. 19-inch drag lagging has large cable capacity. Long lead from fairlead to drum.



CLUTCH SAVES CABLE

Koehring exclusive power clutches prevent shock loading, are easy on cable. You always get smooth engagement without jerking because speed of drum-shaft rotation controls speed of engagement.

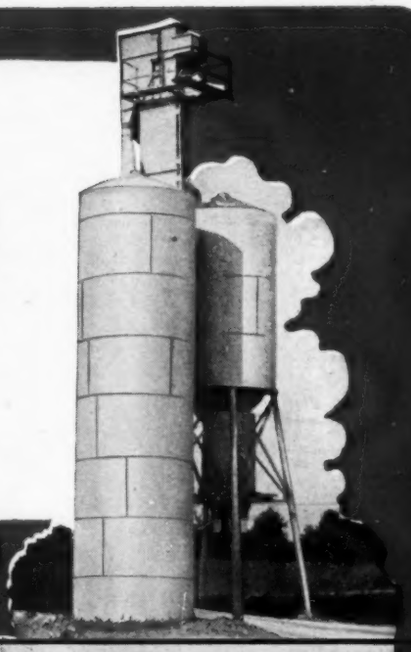


MILWAUKEE 10, WISCONSIN

Top Capacity plus Full Portability

Johnson Twin Silo bulk cement plant stores as much as 1550 barrels of cement, yet is fully portable. Welded construction speeds erection. When disassembled, units easily load on flat cars or flat bed trucks.

Other sizes:
1274 bls. 990 bls. 708 bls.



C. S. JOHNSON
CHAMPAIGN, ILLINOIS
KOEHRING SUBSIDIARY

Straight, Clean Trenches for Sewers, Pipe, Water Mains

Parsons 250 Trenchliner*, product of more than 40 years of trencher building experience, incorporates all the desirable features that make money for you on trenching jobs. Telescoping boom for easy depth adjustment. Shifts from side to side across full Trenchliner width.

*Reg. Trademark.

PARSONS COMPANY
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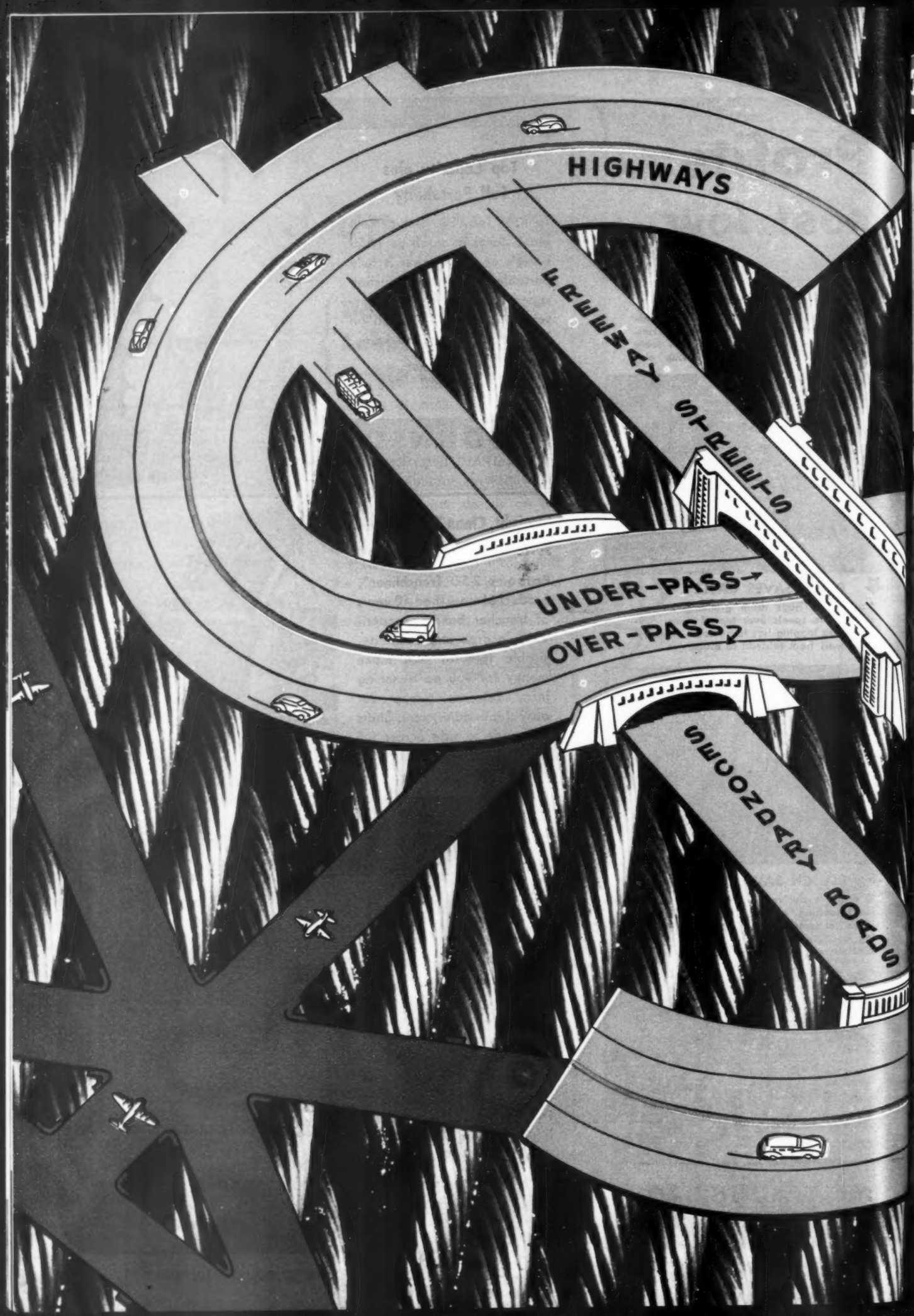
NEWTON, IOWA

Full Batch Discharged in 7 Seconds

Tilted Flow-Line Discharge Chute, exclusive on the Kwik-Mix Dandie line of concrete mixers, reaches deeper into the drum, intercepts tumbling concrete at just the right angle to maintain natural flow-line in discharge. Kwik-Mix Dandie mixers are available in the following sizes: 3½-S, 6-S, 11-S, 16-S.

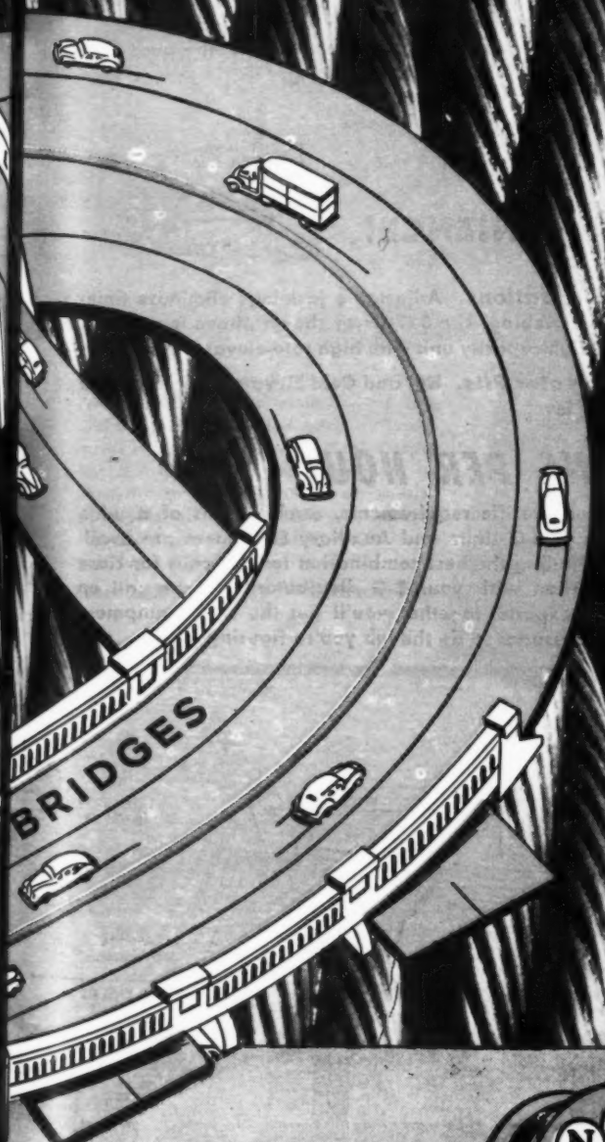
KWIK-MIX COMPANY
KOEHRING SUBSIDIARY
PORT WASHINGTON WISCONSIN


HIGHWAYS
UNDER-PASS
OVER-PASS

GOOD ROADS ARE CHEAP!

Figured on a per year instead of a per mile basis, good roads will cost nothing because they will pay off in miles, minutes and lives. Time and delay studies show that lost minutes at 1 cent per minute, per car and lost miles at 3 cents per mile, per car will more than pay the yearly cost of modern highways tailored to fit traffic flow and load. Facts from the Public Roads Administration's accurate inventory of highways and traffic indicate that—

AMERICA CANNOT AFFORD TO WAIT UNTIL THERE ARE 100 CENTS IN THE DOLLAR NOR UNTIL THERE IS UNEMPLOYMENT TO BE RELIEVED



MAKE RESERVATION NOW — VISIT WORLD'S FAIR OF CONSTRUCTION MACHINERY

The gigantic jobs of highway, airport, flood control, irrigation and soil conservation construction planned for America could not be accomplished for ten times present costs were it not for the fact that the construction equipment industry has designed, engineered and developed cost-cutting, man-hour-saving machinery far ahead of anything ever before heard of.

It will be there—at Soldier Field, Chicago, July 16-24, 1948, the Road Show — World's Fair of Construction machinery. Spectacularly and colorfully displayed in an arena the size of 30 football fields, you'll see hundreds of mechanical miracles ranging from push-button-jobs up to 200 tons in weight. No construction man can afford to miss it. Everyone in the profession will find the exact cost-cutting equipment needed to handle this responsibility in the tremendous construction projects America must start and finish with greater speed than ever before.

Make your hotel reservation NOW. Write American Road Builders Association, 1319 F. Street, Washington, D. C.

UNION WIRE ROPE CORPORATION
2200 Manchester Ave. Kansas City 3, Mo.

union Wire Rope
union-formed is Preformed

New! THIS B G HIGH

..Coordinated Equipment for Finest Bituminous Mixing Performance

The B-G Method of bituminous mixing has for years proved its superiority.

Now Barber-Greene presents more new and important time-and-cost-saving advantages in this latest B-G Central Mixing Plant equipment.

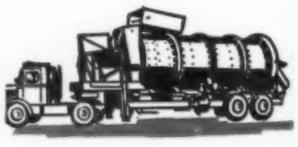
Barber-Greene engineers have developed a new, simplified drive system. Power is transmitted from a central power unit—through shafts—to the Dryer, Cold Elevator, Reciprocating Feeder, Hot Elevator and Gradation Control Unit.

4-bin Gradation Unit with 3½-deck vibrating screen provides new ease and flexibility of multiple aggregate control. Aggregate calibration and bin sampling have been simplified. Convenient hoisting device makes it easy to erect Hot Elevators and screen.

The need for pits for Hot and Cold Elevators has been eliminated.

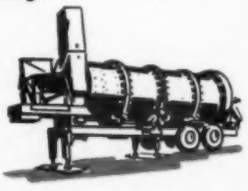
All these—and others—are features you want, and what you'd expect of Barber-Greene, the pace setter in better bituminous mixing.

..New PORTABILITY!



Semi-Trailer Mounting **on Model 837 Dryer and Model 866 Gradation Control Unit; Model 880 Hot Elevators have removable pneumatic-tired dolly for towing; all units designed for maximum portability, flexibility, ease and speed of erection.**

..New CONVENIENCE!



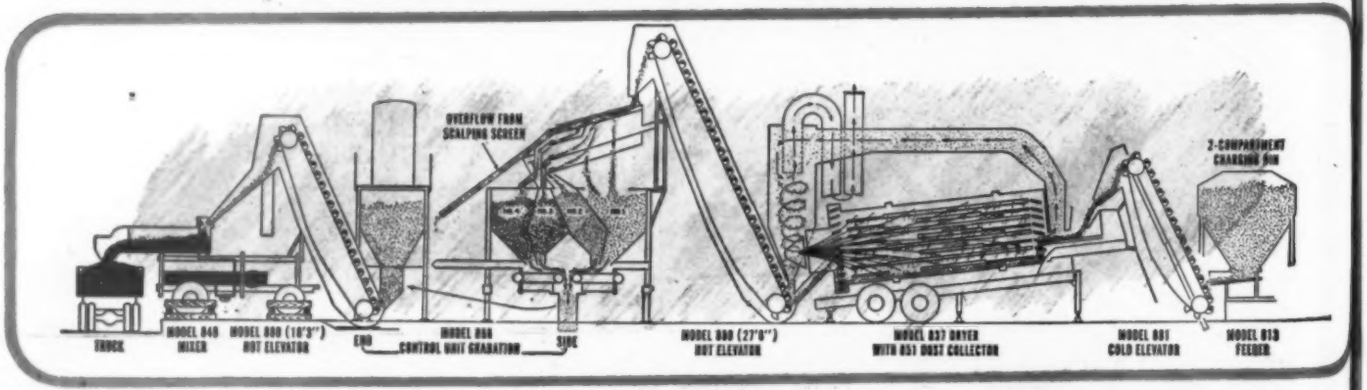
No Foundations. **Adjustable jack-legs eliminate time-wasting cribbing. The 837 Dryer shown above is a single-drum, high-capacity unit with high roto-elevator discharge.**

No Elevator Pits. **Hot and Cold Elevators operate from ground level.**

FROM 80 TO 120 TONS PER HOUR

That's what you can do with this new B-G Central Plant. Flow Chart below illustrates the B-G Continuous Flow Method: measured volumetric aggregate content, metered bitumen supply, controlled temperature and thorough twin-pugmill mixing to assure proper coating of aggregate —these are coordinated by B-G engineered equipment.

For your specific requirements, combinations of a wide variety of B-G Units and Auxiliary Equipment are available. Finding the best combination for you calls for close consultation with your B-G distributor. He can call on factory experts: together you'll get the right equipment and accessories to do the job you're figuring on.



CONSTANT FLOW EQUIPMENT **Barber-**

CAPACITY PLANT!

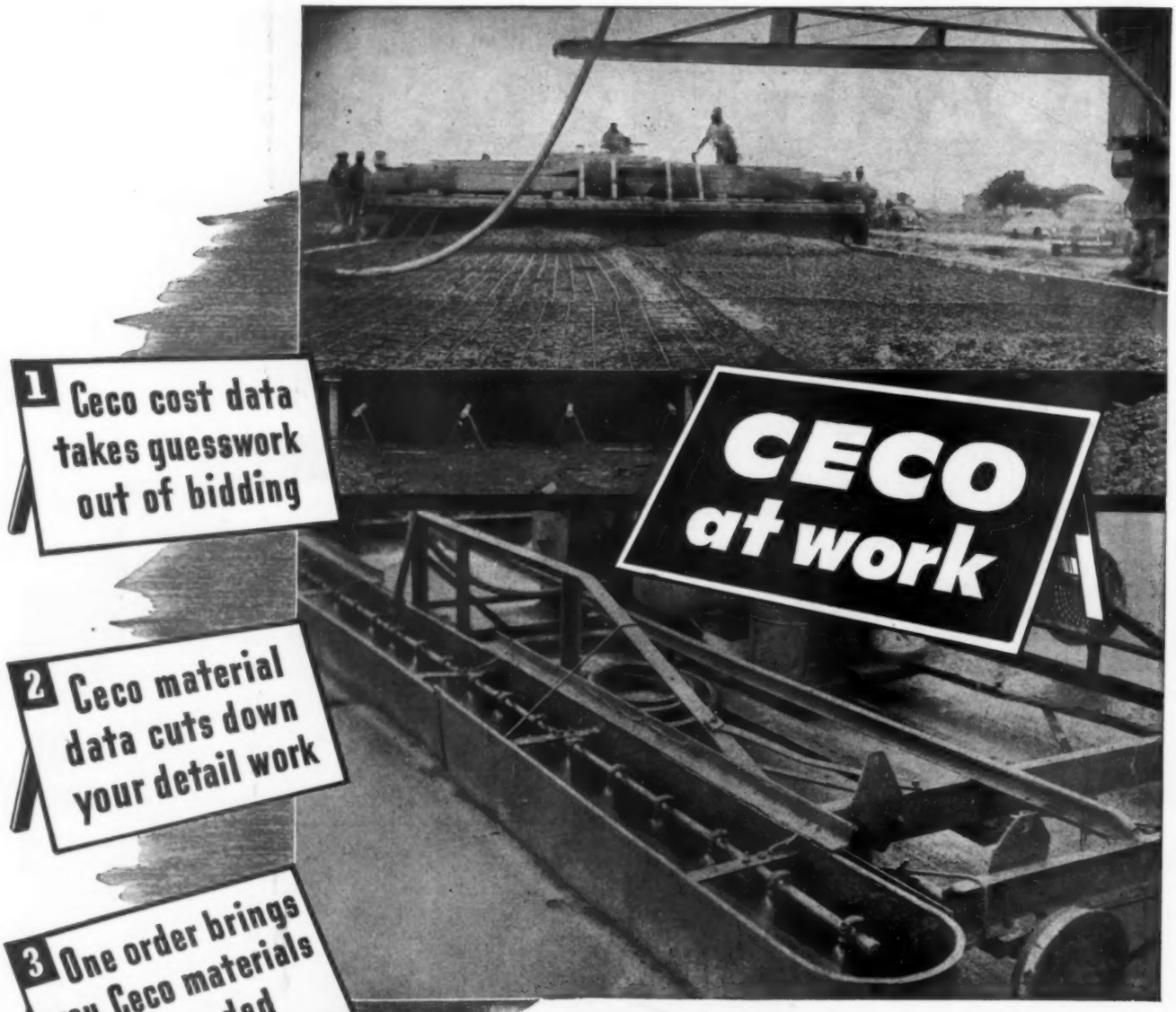
Here's a typical B-G "High-Type" Mixing Plant set-up with Gradation Control Unit, utilizing B-G Coordinated Auxiliary Equipment. For Intermediate-Mix Plant, Gradation Unit and second Hot Elevator are not needed. Dual classification of undried aggregate may be obtained with B-G adjustable 2-gate Reciprocating Feeder. Note that the B-G Method is flexible.

THESE BG ADVANTAGES will interest You

- *High Discharge Dryer which eliminates Hot Elevator pit. Positive charging feeder on Dryer prevents bridging of stable mixtures.*
- *Shaft and gear box drives, with sealed antifriction bearings and fewer power units.*
- *Four-bin aggregate separation — your choice of 2, 3 or 4-aggregate gradation.*
- *Instantaneous bin sampling and simplified calibrating facilities.*
- *Speedier, easier erection and dismantling; semi-trailer mountings for greater portability.*
- *Dual Cyclone Dust Collector reclaims fines from Dryer exhaust gases and reduces dust nuisance.*
- *New Fines Feeder makes it convenient to add a measured proportion of fines.*
- *Extensive application of antifriction bearings.*
- *Lower Maintenance Costs.*
- *Barber-Greene Experience: broadest background in practical application of this most advanced bituminous mixing method. It is at your service—through your B-G distributor.*

See the distributor near you, or write to Barber-Greene, Aurora, Ill. for descriptive literature.

Barber-Greene AURORA, ILLINOIS


1 Ceco cost data takes guesswork out of bidding
2 Ceco material data cuts down your detail work
3 One order brings you Ceco materials as needed
CECO at work

A 3 Point Program for Surer Road Building Profits

CECO offers you more than precision road building materials. It offers you a 3-point program for surer profits based on construction knowledge gained from years of practical experience. Call any one of 23 offices located coast to coast, for engineering skill and fine road building materials . . . plus a plan for road building profits. Remember Ceco's 3-point program takes the guesswork out of bidding, cuts down your detail work and one order brings you materials where you need them, when you need them.

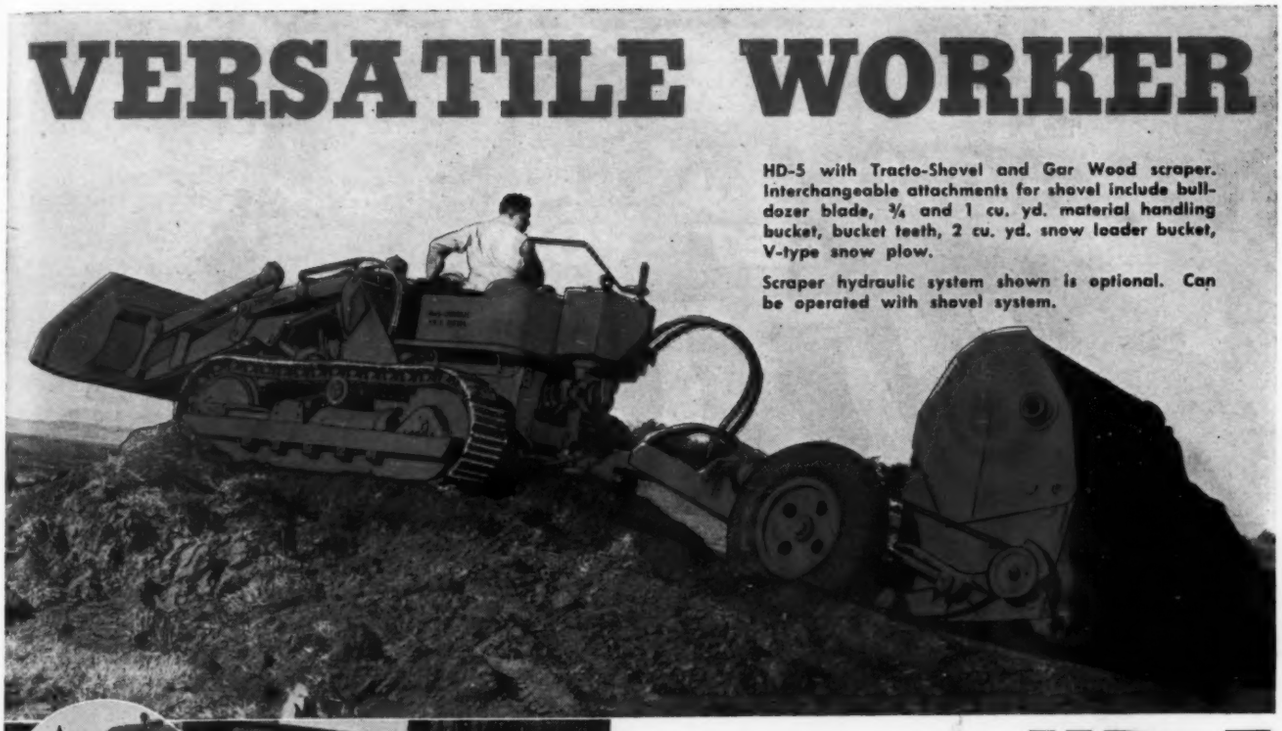
CECO STEEL PRODUCTS CORPORATION
GENERAL OFFICES: 5701 West 26th Street, Chicago 50, Illinois

CECO STEEL

TYPICAL CECO HIGHWAY PRODUCTS • Welded Wire Fabric • Metal Center Strips
Cecure Curing Compound • Reinforcing Steel • Load Transfer Devices • Joint Sealing Compound
Dowel Bar Supports and Sockets • Stake Pins • Expansion Joints • Sub-Grade Paper

In construction products **CECO ENGINEERING** *makes the big difference*

VERSATILE WORKER



HD-5 with Tracto-Shovel and Gar Wood scraper. Interchangeable attachments for shovel include bulldozer blade, ¾ and 1 cu. yd. material handling bucket, bucket teeth, 2 cu. yd. snow loader bucket, V-type snow plow.

Scraper hydraulic system shown is optional. Can be operated with shovel system.

HD-5 with Baker bulldozer and Carco winch combination.

(Below) HD-5 with Gar Wood scraper and bulldozer.

NEW ALLIS-CHALMERS HD-5

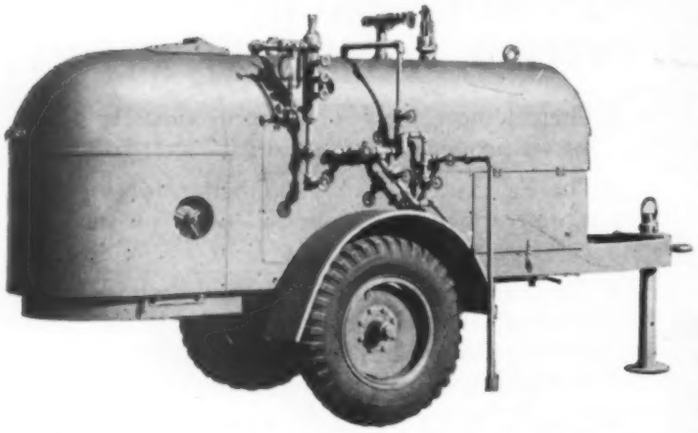
IS NOT JUST A DRAWBAR TRACTOR . . . NOT JUST A BULLDOZER TRACTOR . . . IT'S ENGINEERED TO WORK WITH EQUAL EFFICIENCY PULLING, PUSHING OR LIFTING!

- There's more weight — approximately 11,000 lbs. — properly distributed for better balance.
- There's extra stability and better footing with more track on the ground — 64¼" on standard, 77¼" on shovel model.
- There are larger front idlers, and both idlers and sprockets are closer to ground — means less bobbing, smoother, more accurate operation on bulldozing, snow plowing, shovel work.
- There's FULLY MATCHED auxiliary equipment — each Allied manufacturer, skilled in his own field, works in complete cooperation with Allis-Chalmers engineers in the development of HD-5 auxiliary equipment.

A GREAT TRACTOR WITH A GREAT ALLIED LINE!
37.5 drawbar hp. GM Diesel engine. 5 forward speeds, up to 5.47 m.p.h.; reverse 1.99 m.p.h.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Cleaver-Brooks Tank-Car Heaters have Dry Steam in Tank Car Coils from a Cold Start in 20 Minutes OR LESS!



Cleaver-Brooks Mobile Tank-Car Heater — Not just a boiler on wheels, but a compact, rugged, highly efficient steam generator — built for a specific purpose. Available in two and three tank car heating capacities. Oil-fired, extra-high heat transfer design, dry-coil steam condensate return under pressure — no water or heat losses. Can also be profitably used for an all purpose unit for steam cleaning, thawing and heating.

THE tank car on the siding is the starting point for fast work on any oiling or bituminous surfacing job. The quicker you get the oil or asphalt up to application temperatures and flowing into the relay trucks or distributors — the faster your work crews can get going.

Cleaver-Brooks tank-car heaters are expressly designed to be shooting steam through tank car coils at 125 lbs. pressure in 20 minutes or less. And they can keep going full tilt all day with a very minimum of attention and work because a Cleaver-Brooks tank-car heater uses less fuel and water. Its extra high heat transfer design means fuel savings; its turbine type condensate return means less water . . . every drop of condensate goes back to the heater and under pressure. The capacity for long hours and tough jobs is built into every Cleaver-Brooks Unit. For detailed information write for bulletin RM-102.

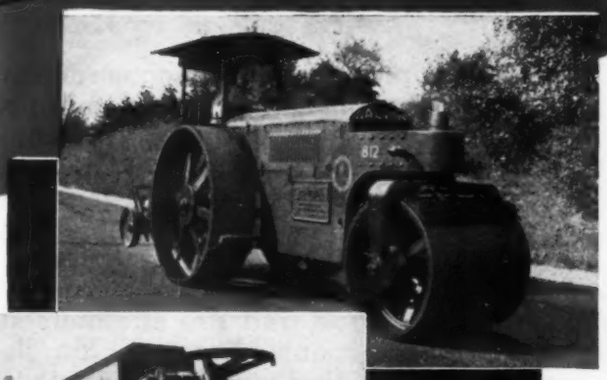
CLEAVER-BROOKS COMPANY
5106 NORTH 33rd STREET • MILWAUKEE 9, WISCONSIN

Cleaver-Brooks

PIONEERS AND ORIGINATORS OF

TANK CAR HEATERS . . . BITUMINOUS BOOSTERS . . . AUTOMATIC STEAM PLANTS

GALION 3-WHEEL ROLLERS Start Easily



FIVE SIZES 6 TO 12 TONS

---because the master clutch completely disengages the transmission so that there is no "drag" on the engine to make starting difficult.

Those who must watch job costs appreciate GALION'S reputation for "no tinkering, no coaxing, no lost rolling time." The assurance of a full days work from GALION Rollers is another of the reasons why they are such a profitable investment.

FEATURES

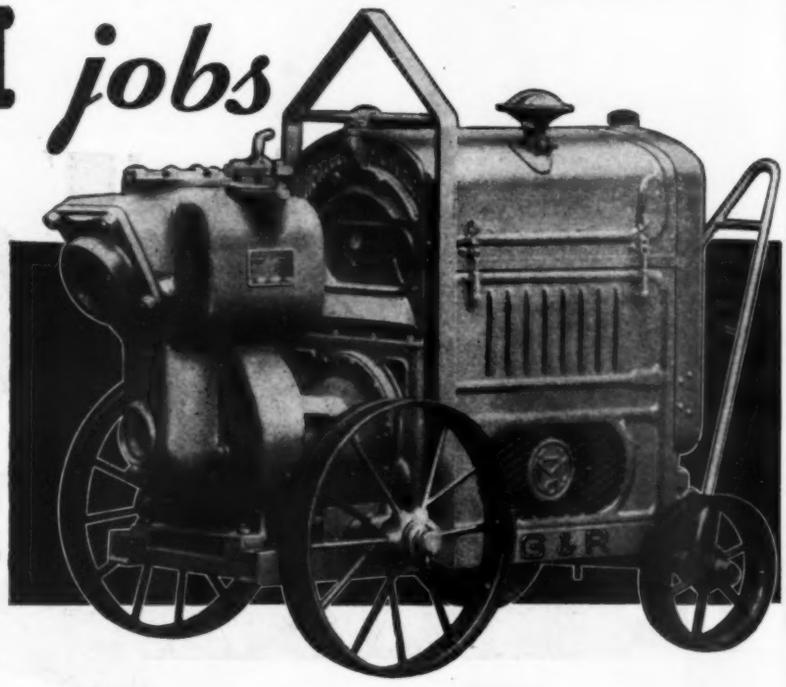
Hydraulic steering--Simple operating controls.
Operator has good visibility of work.
Heavy-duty roller bearings at all vital points.
Large diameter rolls.
Engine and transmission mounted on sub-frame.
Multiple plate clutches for positive action, long life, and velvet-smooth operation.
Extra-rugged construction throughout.
Powerful engine--Diesel or gasoline.

The GALION IRON WORKS & MFG. CO.
General and Export Sales Offices
GALION, OHIO, U. S. A.

GALION IRON WORKS

GRADERS · ROLLERS

TOUGH *pumps that will handle the* TOUGH *jobs*



Gorman-Rupp Heavy Duty Pumps are big, tough and dependable. The Pump pictured here is the Model 1602 (90M), capacity 1,500 GPM at average total head.

"HANDY" PUMP

A tiny pump weighing only 20 lbs., remarkable for performance. Fitted with pipe or common garden hose, this pump will lift up to 25 ft. Delivers 8 GPM at 40 lbs. pressure. Electric motor driven—self-priming. An extremely handy, dependable and trouble-free pump for all kinds of pumping jobs.

Pumps and other equipment used on construction work must take a lot of punishment. Gorman-Rupp centrifugal pumps can help you complete your contracts on time and at a greater profit. They will stay on the job day in and day out for months at a time if necessary with no costly loss of time for repairs.

Gorman-Rupp self-priming centrifugal pumps are by far the simplest pumps made and are streamlined inside where streamlining counts. They will handle any muck, weeds or gravel that will pass the intake strainer. Every part of a Gorman-Rupp pump has long wear built into it and every wearing part is easily and quickly replaced with common tools.

There is a Gorman-Rupp pump as small and handy as a bag of tools, capable of delivering 1,000 G. P.H. and there are other pumps with capacities up to 125,000 G. P. H.

Gorman-Rupp pumps will out-live and out-perform any other comparable equipment.

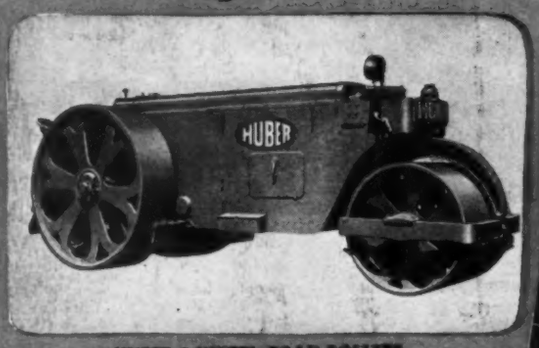
Write for further detailed information or call your nearest distributor.

THE GORMAN-RUPP COMPANY

Gorman-Rupp Pumps — Unsurpassed for Pumping Fast

323 N. BOWMAN STREET • MANSFIELD, OHIO

PIN THIS TO YOUR FUTURE SHOPPING LIST . . .



HUBER 3-WHEEL ROAD-ROLLERS
Automotive type, built in sizes from 5 to 12 tons.

HUBER MAINTAINER
A versatile machine that also serves as a bulldozer, lift-loader, patch roller, snow-plow or rotary broom.

7 REASONS WHY HUBER ROAD MACHINERY IS YOUR BEST BUY

HUBER offers a complete line of road machinery for road, highway, parks and airport construction and maintenance.

●

Built by men who know your problems.

●

Backed by almost three-quarters of a century of experience in building road machinery.

●

Every feature is time proven and tested before going into the field.

●

Only the best materials, carefully selected for their ability to absorb stresses and strains at the right places, are used.

●

Ball and roller bearings used wherever desirable, plus sturdy construction throughout insures long life service.

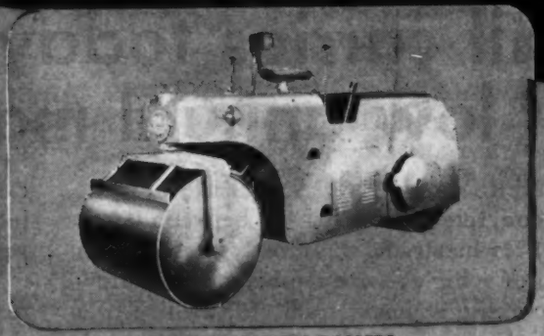
●

Ease of operation – maximum operation economy – a minimum of maintenance.

See your Huber Distributor for a demonstration.

HUBER'S "ONE-MAN GANG"

Do you need a light machine that is as versatile as a one-man-band—but far more useful . . . a maintainer that is a "jack of all trades"—and master of them all . . . then the HUBER ROAD MAINTAINER is the very machine for you. When not working as a scraper or bulldozer, it will: make the snow fly—brush the streets clean—do a good job of patch rolling—or serve as a load-lifter. Have your Huber Distributor put it through its "paces" for you. He will be glad to do it.



HUBER TANDEM ROLLERS
Variable weight, built in sizes from 3 to 12 tons.

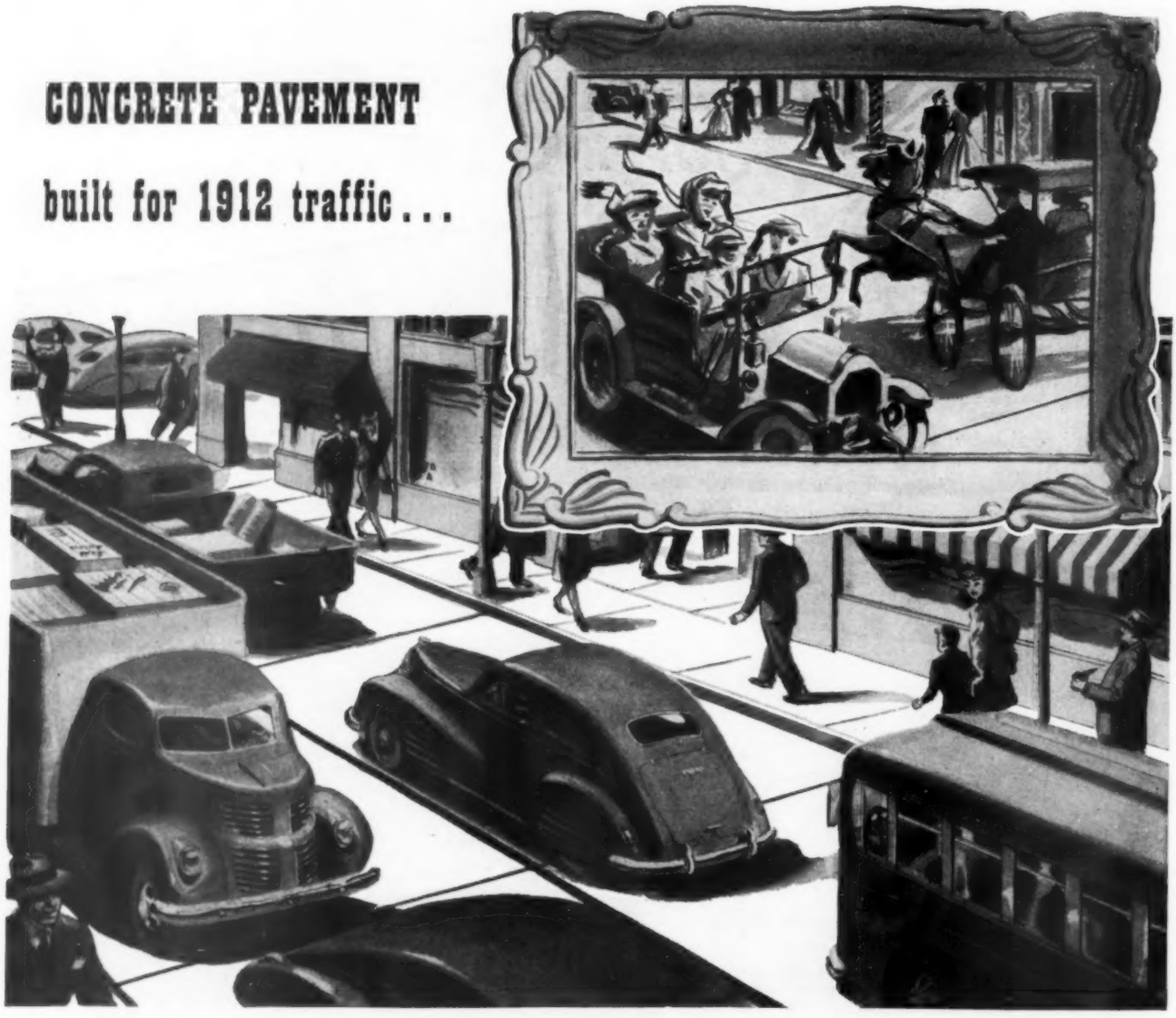
THE HUBER MFG. COMPANY ● MARION, OHIO, U. S. A.

HUBER

3 Wheel ● Tandem ROAD ROLLERS and MAINTAINERS

CONCRETE PAVEMENT

built for 1912 traffic . . .



Still carries today's traffic loads at low annual maintenance cost

CONNERSVILLE, INDIANA, has 58 blocks of concrete streets paved between 1912 and 1915, when traffic was mostly horse-drawn and motor vehicles were a novelty. After carrying increasingly heavy traffic for a third of a century, that pavement is still giving economical service. City Engineer J. D. Nash writes:

"Maintenance costs are still very low, requiring an average annual maintenance of approximately 1¾ cents per square yard. Maintenance consists mostly of keeping the joints in first-class condition, since in most cases, the streets are structurally good. This job requires about three hours per block per year for five men.

"Seventh Street is one of the oldest streets in town and is used as much as any other street in the business section, yet the maintenance, over a period of years, is the same as for some of the newer streets."

For help in planning your next street-paving project, send for a free copy of "The Design of Concrete Pavements for Municipal Streets." Distributed only in United States and Canada.

PORTLAND CEMENT ASSOCIATION

Dept. A12-28, 33 West Grand Avenue, Chicago 10, Illinois

A national organization to improve and extend the uses of portland cement and concrete . . . through scientific research and engineering field work

AGAIN THIS WINTER MORE FWDs MOVING MORE SNOW

When winter throws its snow blockades across field and highway, more FWD trucks will be clearing more snow than all other makes of four-wheel-drive trucks combined . . . keeping highways open for traffic. 52 State and Provincial Highway Departments and more than 800 Counties own and operate FWD trucks.

The ruggedness, four-wheel-drive "going-power" and traction on all wheels make FWD trucks America's No. 1 snow fighters. Snow removal demands heavy-duty truck performance at its best . . . and that's what you get from FWD four-wheel-drive and six-wheel-drive trucks.

Whatever your heavy-duty truck needs may be, you can depend upon FWDs to go more places, do more work, at less cost . . . all year 'round!

See your nearest FWD Distributor or write for complete information.

THE FOUR WHEEL DRIVE AUTO CO.
CLINTONVILLE, WISCONSIN
Canadian Factory: Kitchener, Ontario
WORLD-WIDE SALES and SERVICE

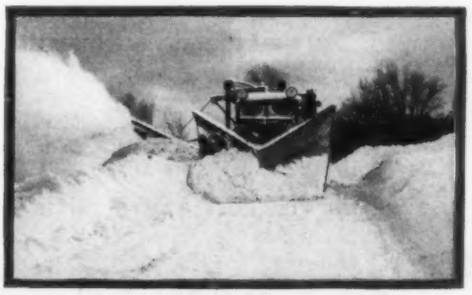
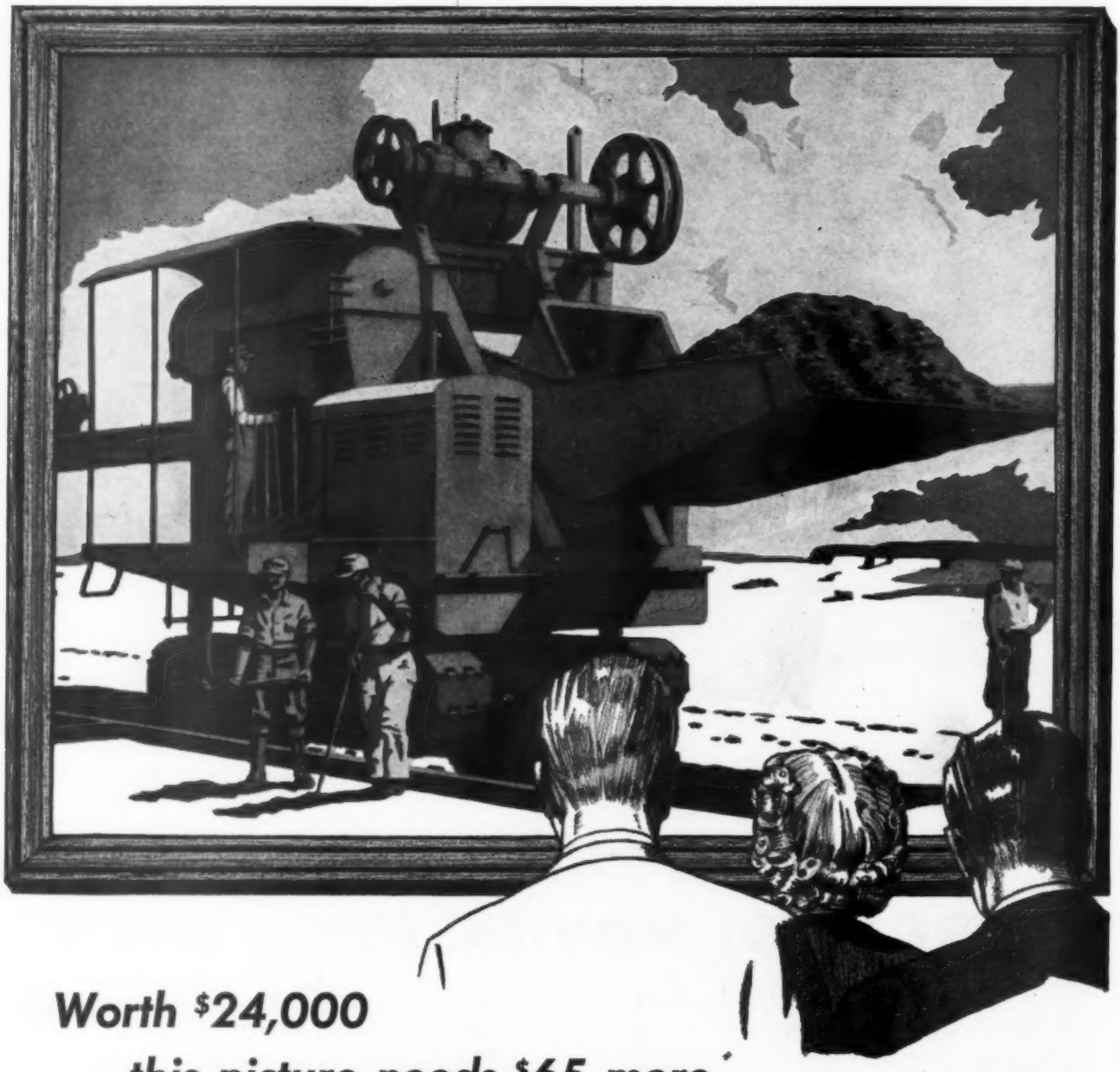


Photo above: FWD Model M7, with snow plow • Photo at left: With 400 miles of road to clear in Michigan's worst snow belt, this FWD Model SU plowed snow all winter . . . more than 100 inches snowfall, officially, up to March 1, for the 1946-47 winter!

America's Foremost Heavy-Duty Truck



Worth $24,000

. . . this picture needs $65 more

This efficient, fast, labor-saving road-paver cost well over $24,000—but it couldn't pave a square foot without wire rope. *That's* what is missing in the picture. How much does the missing wire rope cost? Well—ordinary, non-preformed wire rope costs about $52. The best of all wire ropes—Preformed Improved Plow Steel costs about $65.

Be safe. Be sure. If you use wire rope, use the best. Specify Preformed Improved Plow Steel for your next rope. And when you buy a machine—any machine—make certain it is equipped with Preformed. You will like it because it lasts longer. Your workmen will like it because it is easier and safer to handle.

WRITE FOR FREE COPY of helpful book about Preformed.
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HANDLES EASIER - LASTS LONGER

Perfect Partners

FOR LOW-COST ROAD WORK

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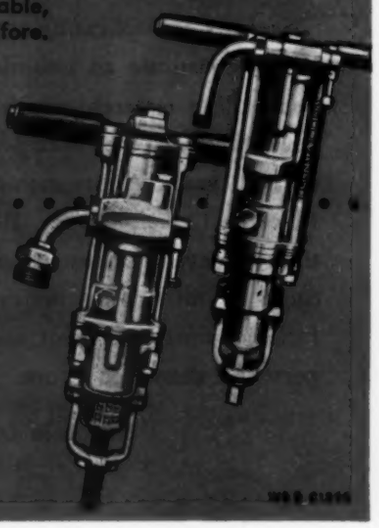
DIESEL DRIVEN
630 c. f. m.

SERIES 80 AIR COMPRESSORS
from 68 to 630 c. f. m.

Two stage, air cooled compressed air plants—gasoline or diesel driven—with size and weight kept to a minimum to make them really portable, yet delivering air more efficiently than ever before.

Econo-Miser Load Control regulates air supply to meet the demand of the job.



Consult a Joy Engineer or write for bulletins

JOY SILVER STREAK
Cadmium Plated Rock Drills

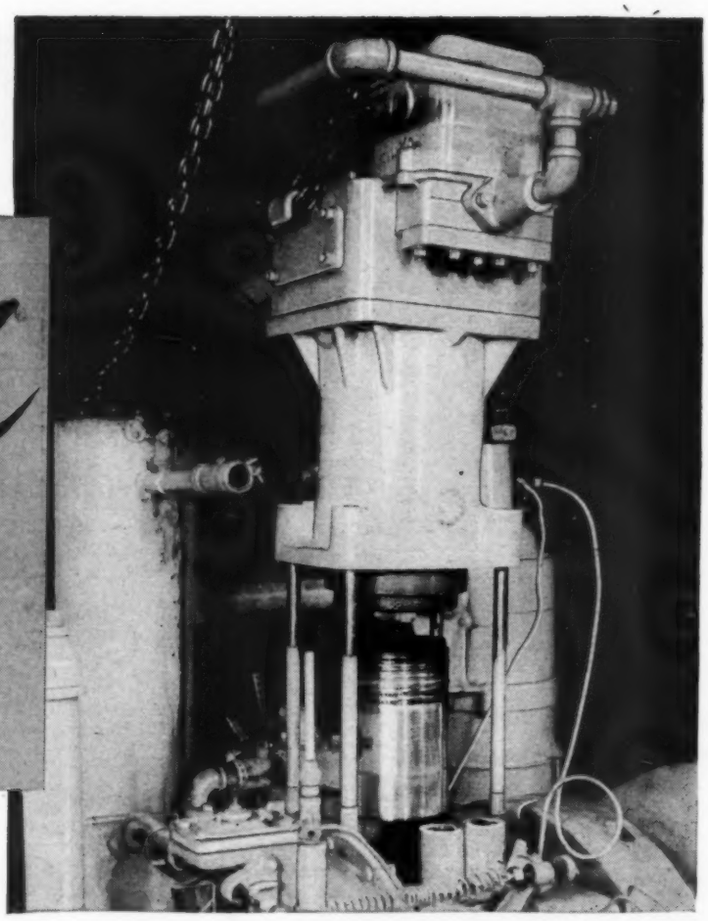
Cadmium plating not only protects your Sullivan drills from rusting, but, the lubricating properties of cadmium prevents scoring should lubrication temporarily fail.

SULLIVAN DIVISION

JOY MANUFACTURING CO.

GENERAL OFFICES: HENRY W. OLIVER BLDG., PITTSBURGH, PA.

Clean ... FROM EAST CHICAGO



At Sinclair Research Laboratories, East Chicago, Ind., skilled technicians specialize in keeping it clean ... for you.

With today's accent on the detergency qualities of engine lubricants, Sinclair Research is constantly making tests to determine the cleansing properties of motor oils, diesel lubricants, and other products, using the special "come-apart" single cylinder diesel engine shown above.

Such tests—duplicating actual operating conditions—constitute an essential part of Sinclair's outstanding research, which has resulted in the development of ever finer petroleum products for over 30 years. At its soon-to-be-completed new Research Center, Harvey, Ill., Sinclair will continue to develop industrial and automotive lubricants of outstanding performance with greater facilities, finer equipment, and more highly skilled personnel than ever before.

Sinclair Automotive Oils

OPALINE TBT OIL

FOR CLEAN ENGINES
FOR MAXIMUM POWER
FOR LOW MAINTENANCE
IN TRUCK, BUS AND TRACTOR

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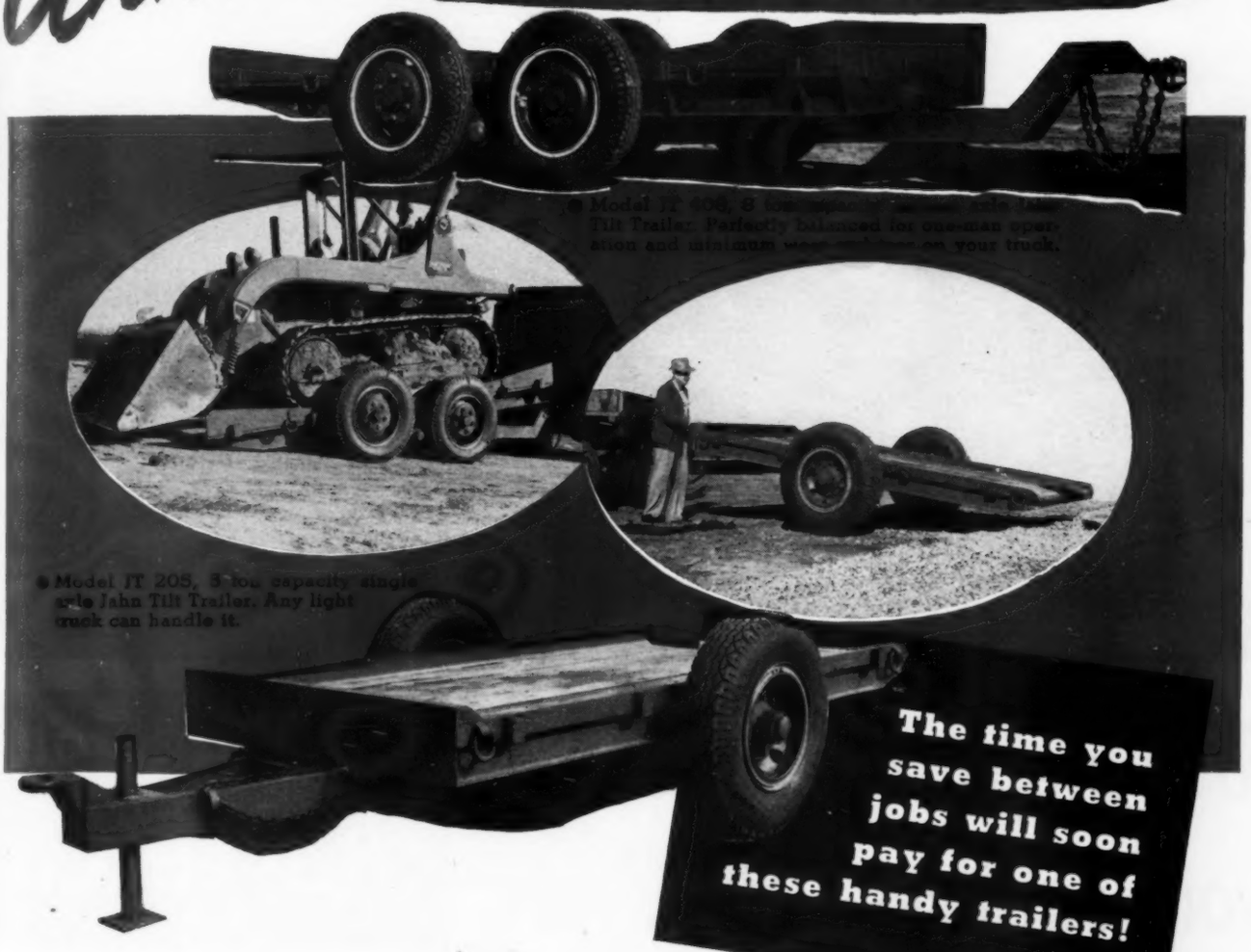
SINCLAIR

Lubricants for Industry

FINEST CRUDES + EXPERT RESEARCH and MANUFACTURING CONTROL = OUTSTANDING PERFORMANCE

Announcing two new JAHN TILT TRAILERS



● Model JT 205, 5-ton capacity single axle Jahn Tilt Trailer. Any light truck can handle it.

● Model JT 606, 6 ton capacity tandem axle Jahn Tilt Trailer. Perfectly balanced for one-man operation and minimum wear and tear on your truck.

The time you save between jobs will soon pay for one of these handy trailers!

Tilt—load—and you're off in a matter of minutes. No jacks or loading ramps required. One man operation.

Positive, automatic safety lock holds platform in position when loaded or empty. Rubber-mounted drawbar absorbs road shocks and protects both truck and trailer. Low in price, economical in operation, dependable in service.

Ideal for transporting tractors—rollers—compressors—shovel-loaders—mixers, etc.

Standard equipment includes lash rings, stake pockets, safety chains, reflectors, drawbar support and adjustable drawbar ring.

Platform guide plates aid in loading and protect your tires. Power brakes and electric lights available at additional cost.

Jahn Tilt Trailers have been field-tested for more than a year and are backed by over twenty years of trailer-building experience. Order now for prompt delivery. Write for specifications and illustrated bulletin or see your nearest Jahn distributor.

JAHN TRAILERS ALL OVER the WORLD!

C. R. JAHN COMPANY

Dept. 1345, 1106 W. 35th Street, Chicago 9, Illinois

Manufacturers of heavy duty trailers from 5 to 100 ton capacities

Four steps to restore worn surfaces...FAST!

STANDARD OIL ASPHALT

Asphalt resurfacing affords a rapid and economical means of providing any worn or broken pavement with a smooth-riding, easily maintained surface. For city streets or four-lane highways, the four steps outlined here describe one method of asphalt application that produces sound, long-wearing roads.

A Standard Oil Asphalt Representative can suggest other economical types of asphalt construction to meet your needs and local conditions. You are assured prompt delivery of Standard Oil Asphalt from any of the five large refineries located throughout the Midwest. Write Standard Oil Company (Indiana), 910 South Michigan Ave., Chicago 80, Ill.

1 Spot Patching—Where the old highway is badly broken, holes are patched by filling with an asphalt-aggregate mix delivered hot from a central mixing plant.

2 Prime Coat—This is a thin coat of cut-back asphalt spread over both the old road surface and the patches that have been brushed clean. It helps to bind the asphalt to the old surface.

3 Binder Course—An asphalt-aggregate mix is delivered hot from the central mixing plant to an asphalt-finishing machine, and is laid from 2 to 3 inches deep over the old road surface and patches.

4 Wearing Course—This is the top course composed of asphalt, stone, and sand. It is mixed hot at the central mixing plant and laid by machine. This top course presents a smooth, waterproof, long-wearing surface which requires no seal coat or stone application.

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

LOOK into UNIT!

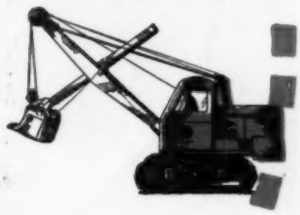
Many of the exclusive features found in UNIT equipment were built around the ideas and suggestions of the operators themselves — men who know what they want! "LOOK INTO UNIT" . . . and you will want UNIT too.

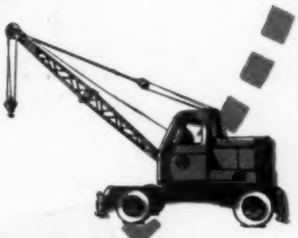
Lift the FULL VISION CAB from any UNIT crane or shovel—

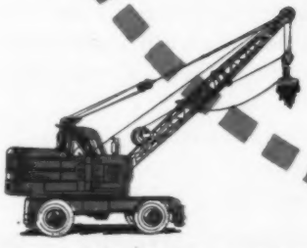
And You'll Find . . .

- Power without bulk . . . It's fast and easy on the swing . . . Easier on the operator . . . economical.
- Trouble-free construction throughout entire machine.
- One-piece cast gear case completely encloses all gears and shafts in a constant flow of oil.
- Heavy-duty . . . Disc type clutches . . . interchangeable . . . with easy and simple adjustments . . . smoother operation.
- Heat-treated alloy steel gears and shafts . . . involute splined. No keys to replace . . . No worn out keyways.
- Gas or Diesel engines . . . mounted in straight line with main machinery . . . Worm driven power take off.
- Longer tracks . . . wider shoes . . . perfectly counterbalanced for the tough lifts . . . better traction and stability.

Write today for complete details.







½ and ¾ YD. EXCAVATORS, 5 and 10 TON CRANES

Convertible to ALL ATTACHMENTS — Shovel . . . Clamshell . . . Dragline . . . Trenchoe . . . Magnet.

CONTACT FACTORY DIRECT FOR PRICE AND DELIVERY

or See Your Dealer

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UNIT CRANE AND SHOVEL CORP., 6407 W. Burnham St., Milwaukee 14, Wis., U.S.A.

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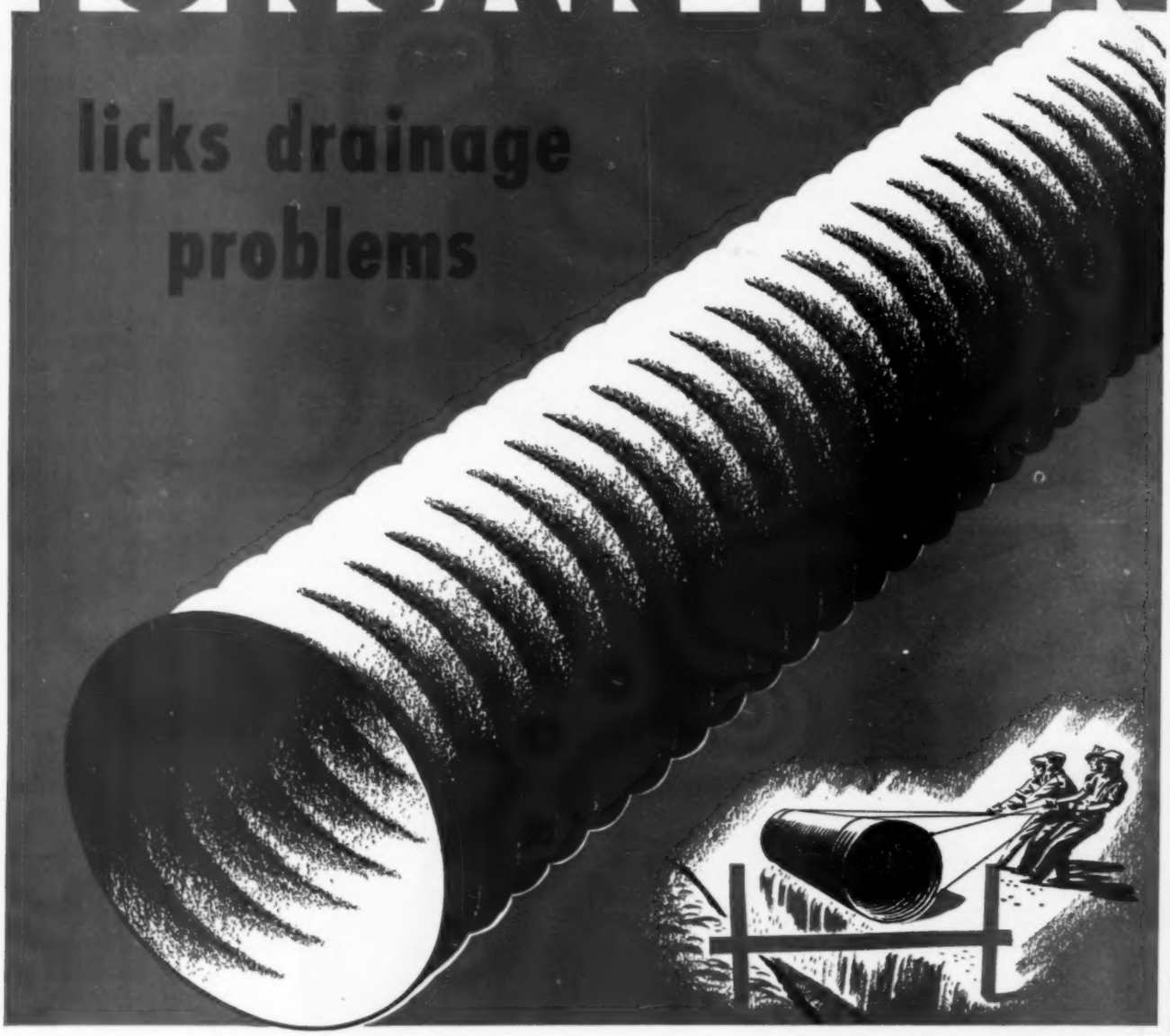
TONCAN IRON

licks drainage problems



. . . because *TONCAN** Iron Corrugated Metal Pipe . . .

1. Is strong and flexible—carries tremendous loads without breaking or crumbling.
2. Resists vibration, impact, severe weather changes and settling earth or fill.
3. Is light in weight and remarkably easy to handle and install with unskilled labor.
4. Contains twice the copper found in copper-bearing steels and irons—*plus* molybdenum.
5. Resists rust and corrosion caused by water, soil or sewage.
6. Cuts installation and maintenance costs to rock bottom levels.
7. Lasts longer than the utility for which it is installed.
8. Is 100% salvageable. May be re-used without any loss.

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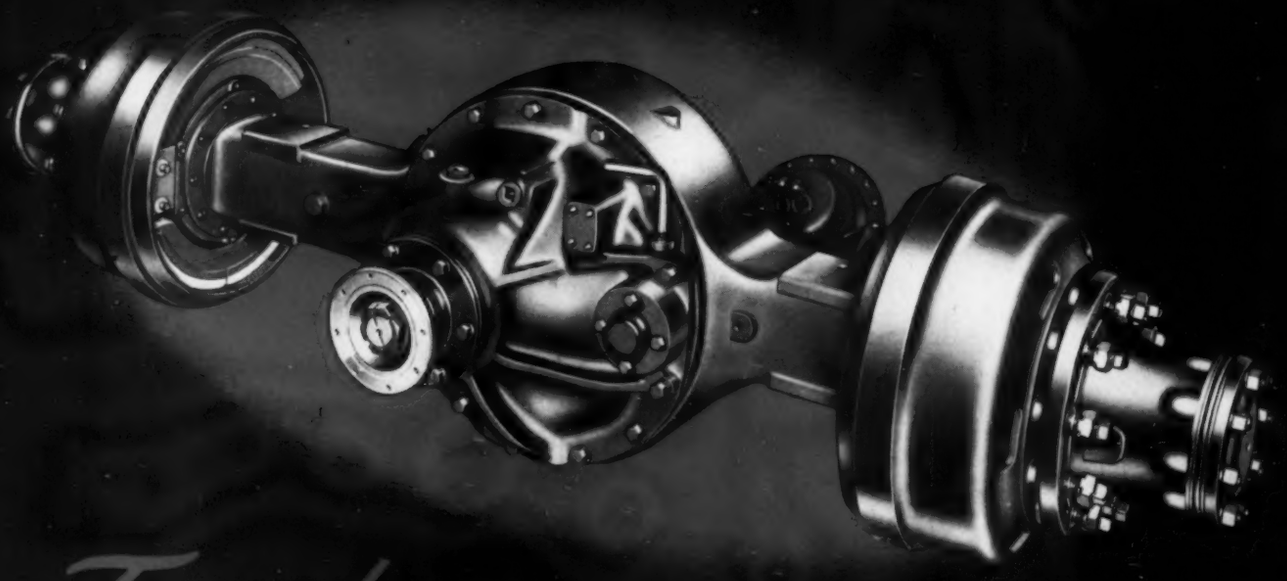

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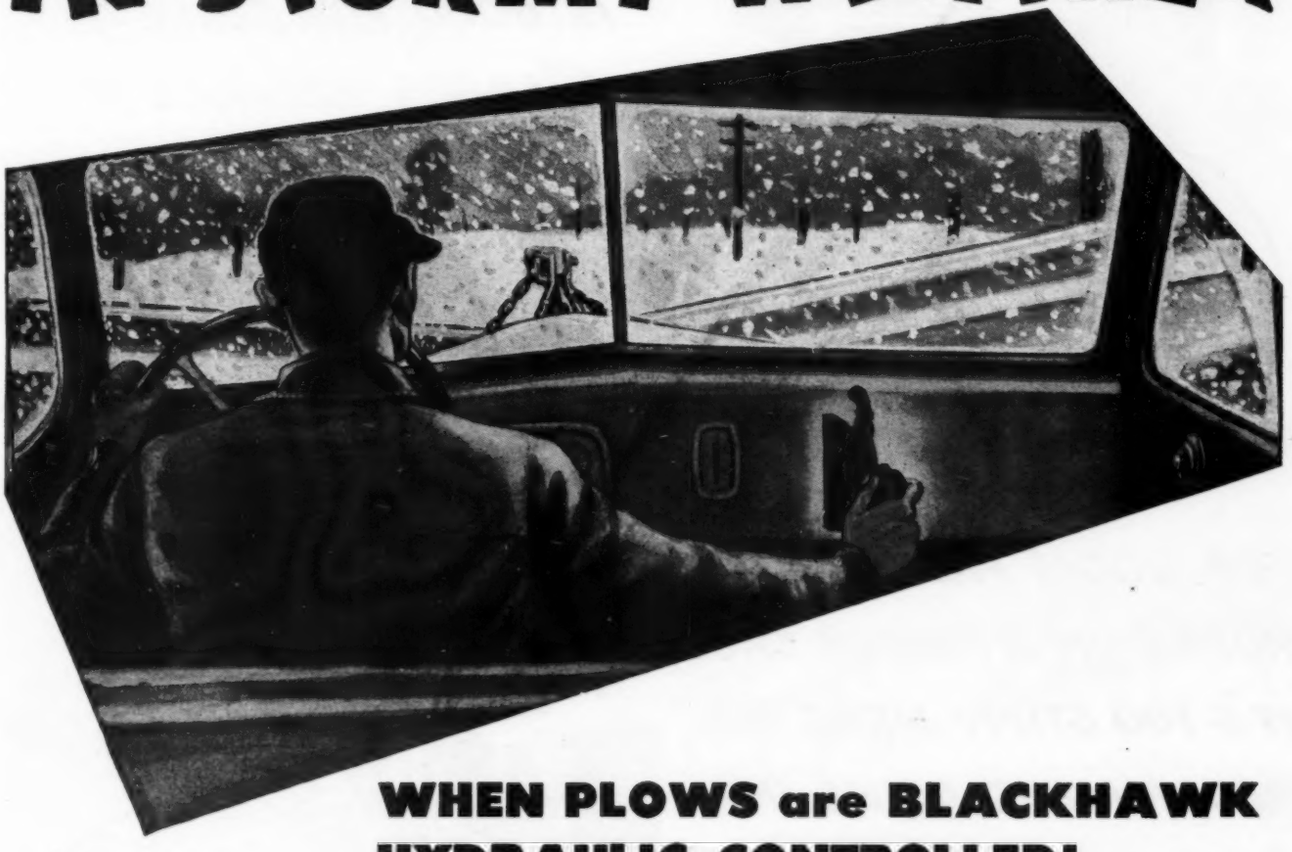

WHEN PLOWS are BLACKHAWK HYDRAULIC CONTROLLED!

A flick of a valve and the Blackhawk Hydraulic System adjusts the blades for another bite into the blizzard. And like the men who use 'em, the men who build 'em know the ease, speed and accuracy with which Blackhawk Hydraulic Controls lift and lower plow blades. That's why Blackhawk is standard equipment with 9 out of 10 snow plow manufacturers. For dependable performance specify Blackhawk Hydraulics on ALL your road equipment. For complete information on the advantages of Blackhawk Hydraulic Controls, write your equipment manufacturer.

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Blackhawk Hydraulic Controls are engineered and priced for *quantity* purchase and *practical* installation on your products for even greater customer satisfaction. Submit your hydraulic problems to us. We will work with you in confidence.

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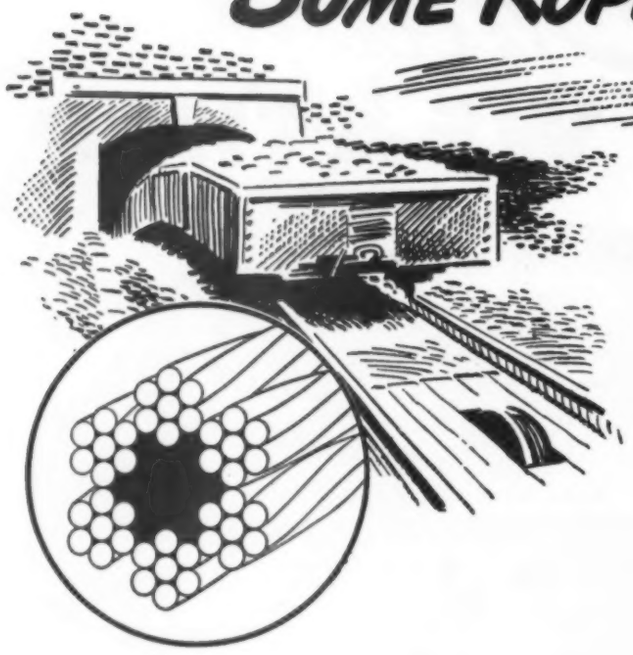
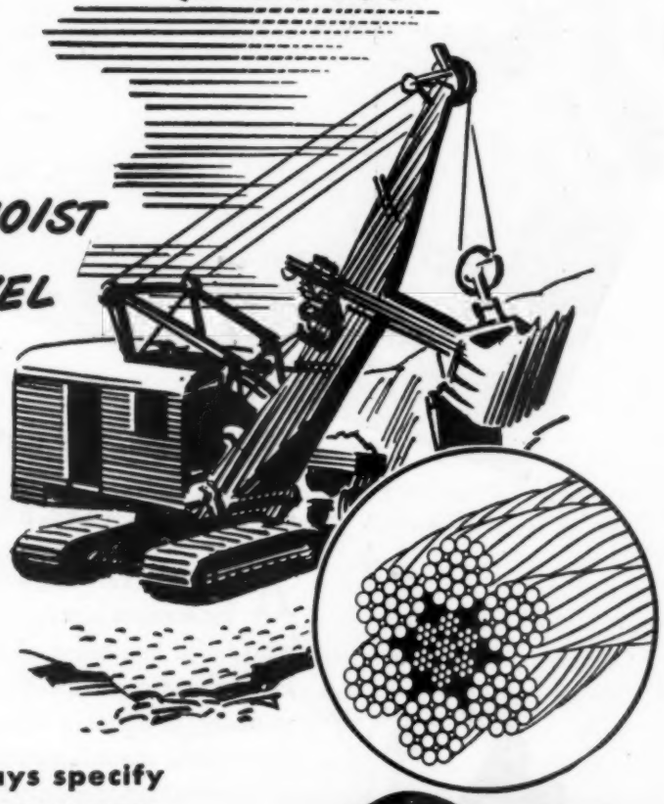
SOME ROPES FOOL YOU



U-W 6x7 WIRE ROPE IS GOOD FOR SLOPE HAULAGES BECAUSE IT IS COARSE AND RESISTS ABRASION —

BUT...



FOR BOOM FALLS AND HOIST ROPES ON A POWER SHOVEL IT'S TOO STIFF. HERE WE RECOMMEND USING U-W 6x19 FILLER WIRE CABLE WHICH IS MUCH MORE FLEXIBLE

For longest and best service, always specify
U-W LAYRITE (*Preformed*) **IMPROVED PLOW STEEL**

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RIDING A LONG SLOPE . . . All-Wheel Steer holds both ends steady.

CLEANING A WET DITCH . . . keeping rear truck on road.

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Built to Outperform

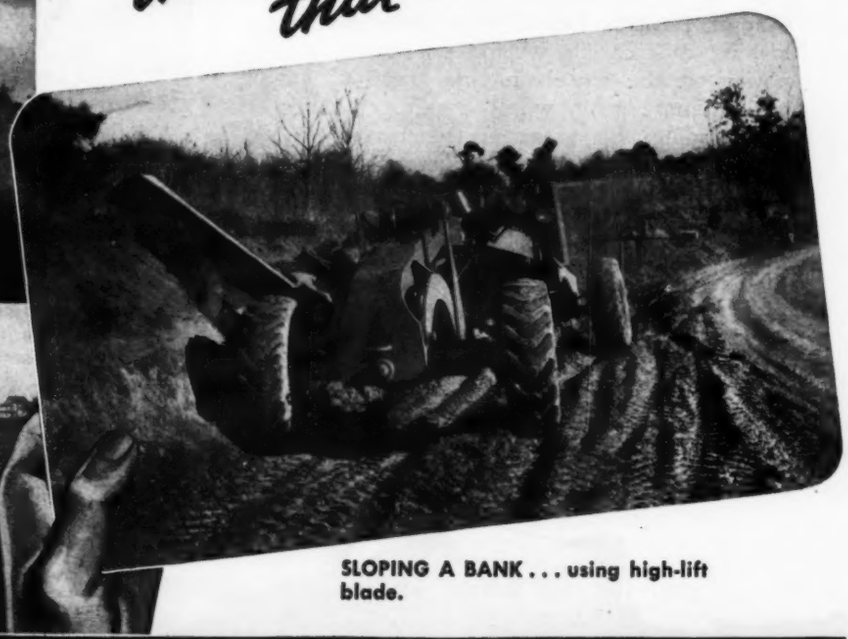
No Motor Grader without All-Wheel Drive and All-Wheel Steer can hope to equal the all-around operating efficiency of the Austin-Western "99-H" Power Grader, with its High-Lift Blade, Extreme Blade Reach and Completely Reversible Blade.

On the "99-H" there are no idling front wheels—no dead front end to consume power and decrease operating efficiency. The entire weight of the machine is on the driving wheels—front and rear—contributing 100% to traction, and getting the most out of the 13-foot blade.

All-Wheel Steer provides unequalled maneuverability; saves time on every job; makes it possible to work in places where ordinary motor graders cannot go—do things they cannot do.

AUSTIN-WESTERN COMPANY • AURORA, ILLINOIS

Yes - it's the Power Grader that has Everything



SLOPING A BANK . . . using high-lift blade.

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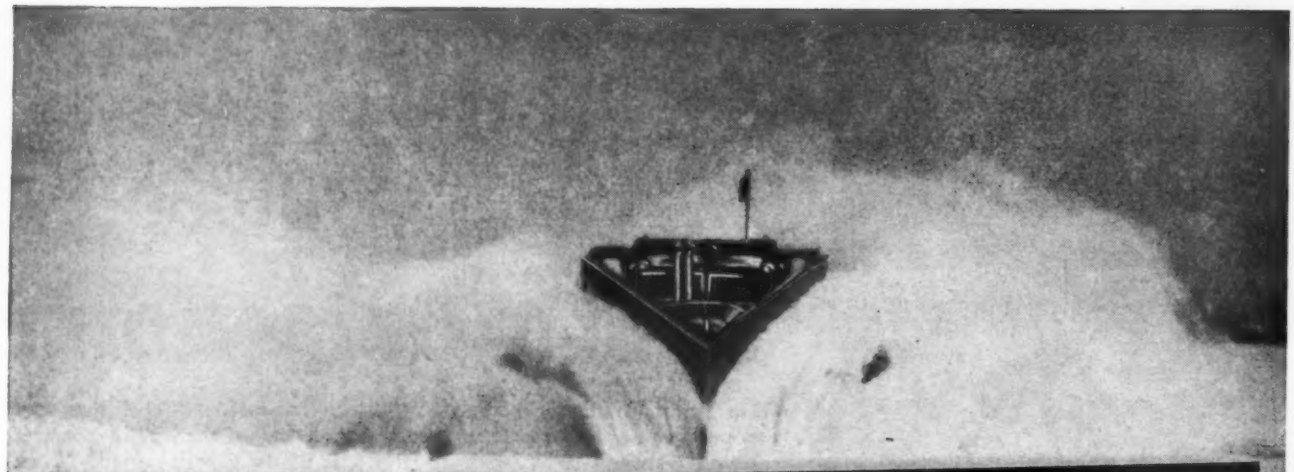

No other equipment can clear snow as fast—hit drifts as hard as *WALTER SNOW FIGHTERS*

Without traction, a truck is helpless on snow and ice. With limited traction, much of its power is wasted. But with *full* traction, as provided only by Walter Snow Fighters, every ounce of engine power is put into fast pick-up, sustained high speeds and tremendous pushing force.

How is this obtained? Through the Walter 4-Point Positive Drive, with three automatic locking differentials which concentrate engine power on the wheels having traction, at all times. There is no wheel-spinning, stalling or side-slipping. So great is the traction, that many highway departments operate successfully without using chains!

This tremendous traction, power and speed permit you to mount the biggest, most efficient plows and remove a greater volume of snow on each run. You clear your routes faster, throw snow farther, blast through deepest drifts.

Ask your Walter distributor for detailed facts and figures. Literature sent upon request.

Full traction, with less ballast

● Walter Snow Fighters provide full traction with much less ballast than other trucks. There is less deadweight to cut down speed and pushing power. There is less danger of overloading small bridges and roadways of limited tonnage capacity.

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SNOW FIGHTERS

Fitting into the scenery- and into BUDGETS, too-

KOPPERS

PRESSURE-CREOSOTED HIGHWAY BRIDGES

Here is one of the multitude of Koppers Pressure-creosoted highway bridges that have helped highway departments to please the traveler's eye . . . *and the taxpayer's pocketbook.* The smaller view shows how adaptable these bridges are to special conditions. Vertical clearance is limited, and so a long, clear span is desirable. The designers therefore supported the deck on a long, deep girder.

Koppers Pressure-creosoted trestle bridges are economical in first cost; engineers have reported savings of 50% or more over other permanent types of construction. They require little maintenance, as the treatment gives enduring protection against decay and weathering. They can be readily altered in dimension if changing traffic conditions demand it, and in case of relocation maximum salvage of parts is possible. Koppers is equipped to preframe all members to blueprint prior to treatment, and assembly can be speedily handled by highway crews with local labor and equipment.

You probably have a number of bridges in prospect in connection with your highway program. Ask how Koppers pressure-treated bridges can help make your budget dollars go further.

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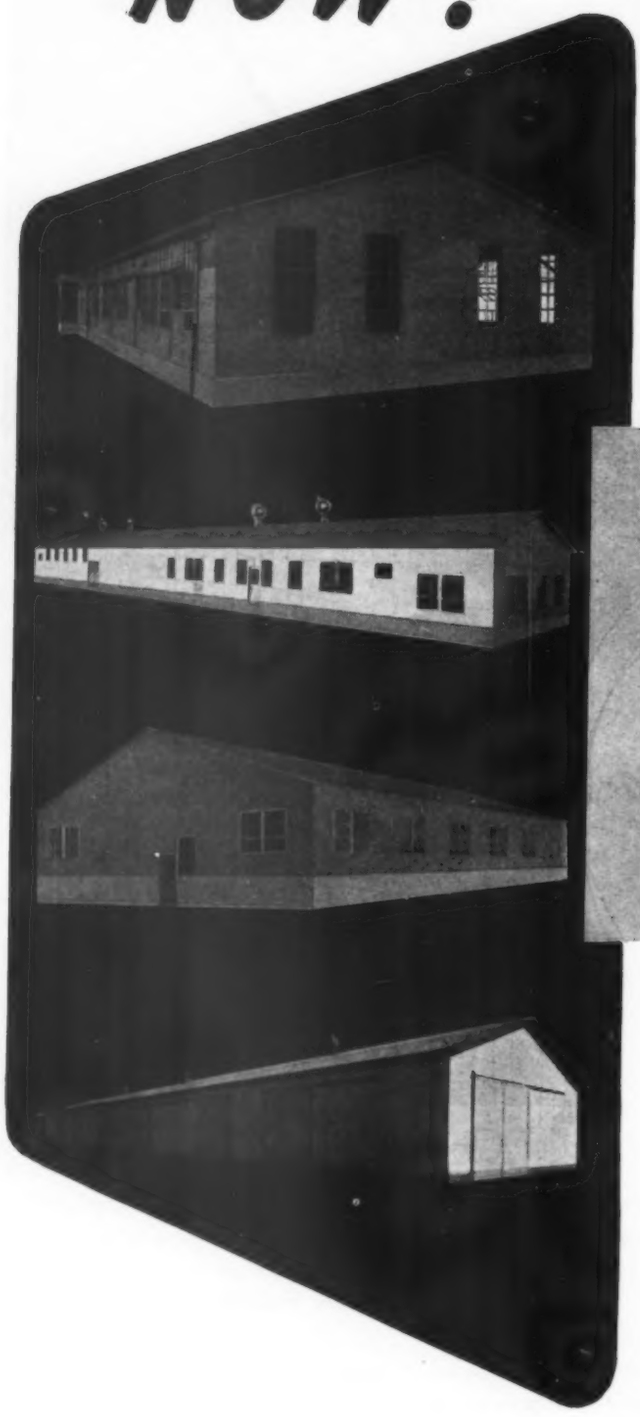
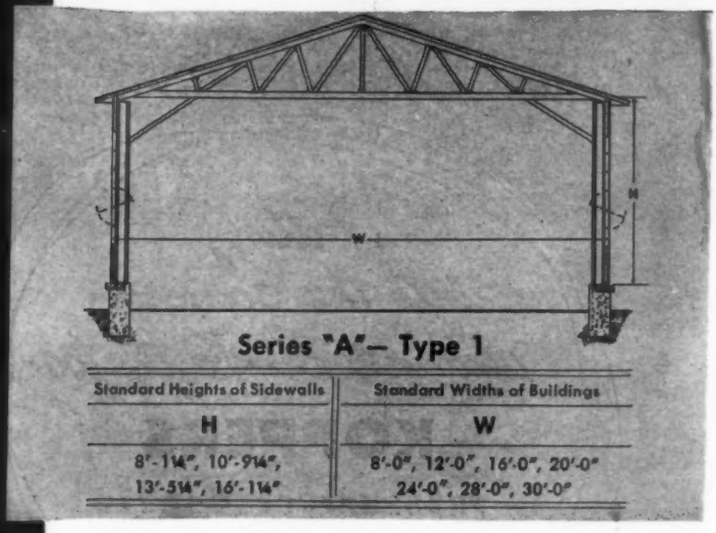
NOW! Prompt Delivery of TRUSCON STEEL BUILDINGS

In sizes not exceeding 30′-0″ in width, 16′-1¼″ in height and lengths in multiples of 4′-0″.





Series "A"— Type 1

Standard Heights of Sidewalls	Standard Widths of Buildings
H	W
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The Answer to your Needs for Additional Buildings RIGHT NOW!

● Meet today's needs for more enclosures by building or enlarging with Truscon Standardized Steel Buildings. Standard designs, prefabricated, highly versatile and adaptable. Features include fire protection, permanence, ease and speed of erection, low upkeep, quick dismantling and re-erection, low cost and high investment value. Buildings are available with either interlocking painted steel or 18 gauge 1½ inch Ferrobord roof with insulation and waterproofing. Truscon engineers will give you experienced planning help for any need—write now!

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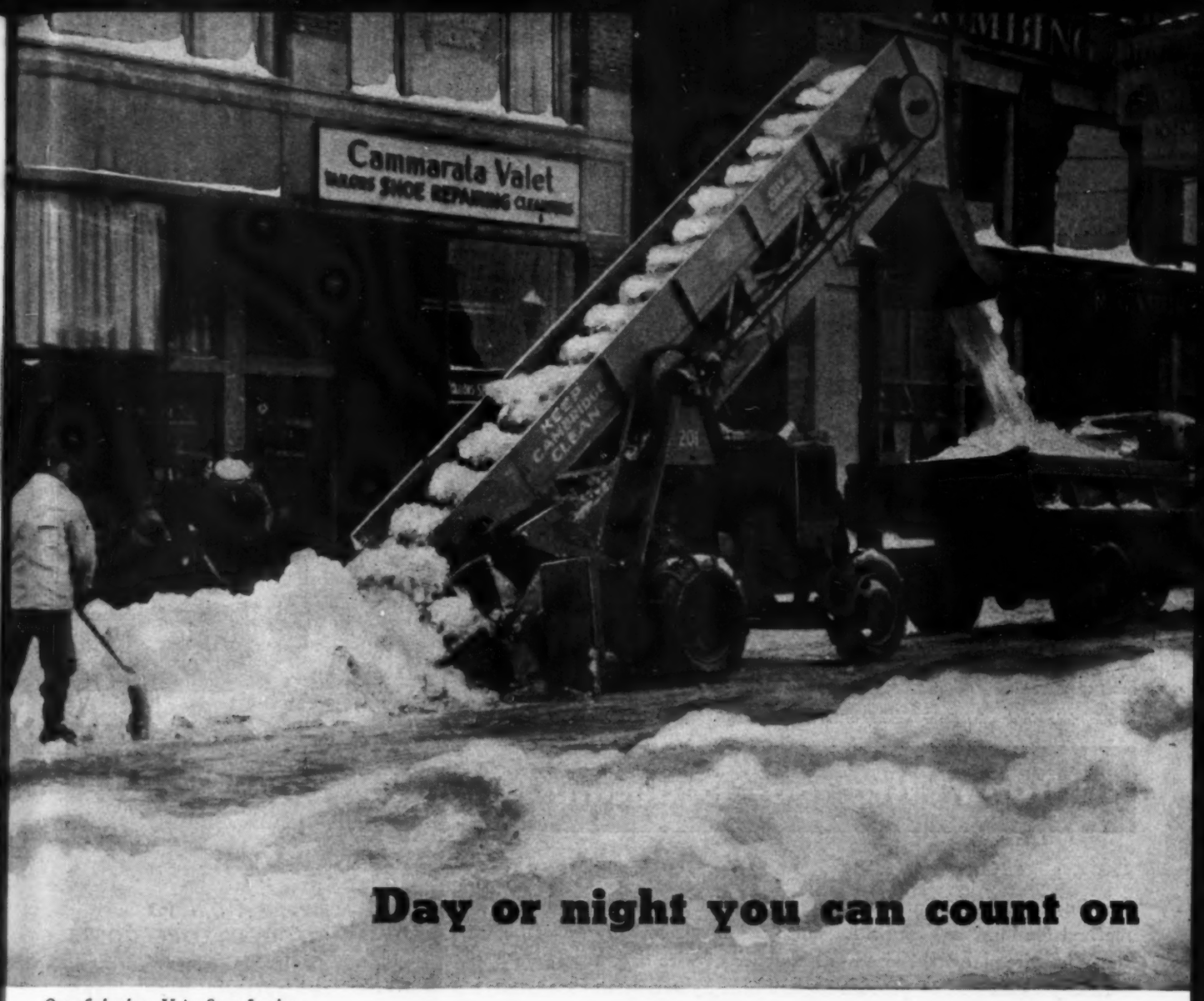

Day or night you can count on

One of the three Haiss Snow Loaders owned by The City of Cambridge, Mass.

Haiss Snow Loaders

Haiss snow loaders fill trucks fast, cleaning up congested traffic areas in a few hours.

They are designed for 24-hour operation in very cold weather. Communities which have a big snow removal problem run them day and night. These machines are highly mobile, and get about quickly between working locations under their own power.

Each Haiss snow loader does the work of 80 men, and loads 15 yards a minute. It reduces truck rentals by $200 to $300 or more per 8-hour shift.

Because of the chopping action of the propeller blades, and the positive upward lift of the conveyor scoops, this rugged machine is thoroughly dependable in hard and frozen snow.

Our nearest sales representative will gladly arrange for you to see one in action.

* * *

Haiss is now a wholly-owned subsidiary of Pettibone Mulliken Corporation of Chicago. With new management and much larger resources, Haiss can now do a still better job for its customers... better machines and servicing, larger production, quicker deliveries.

Haiss specializes in equipment to load bulk materials... snow, sand, gravel, stone, coal, top-soil, etc.

Its machines are money-makers for their owners.

GEORGE HAISS MANUFACTURING CO.
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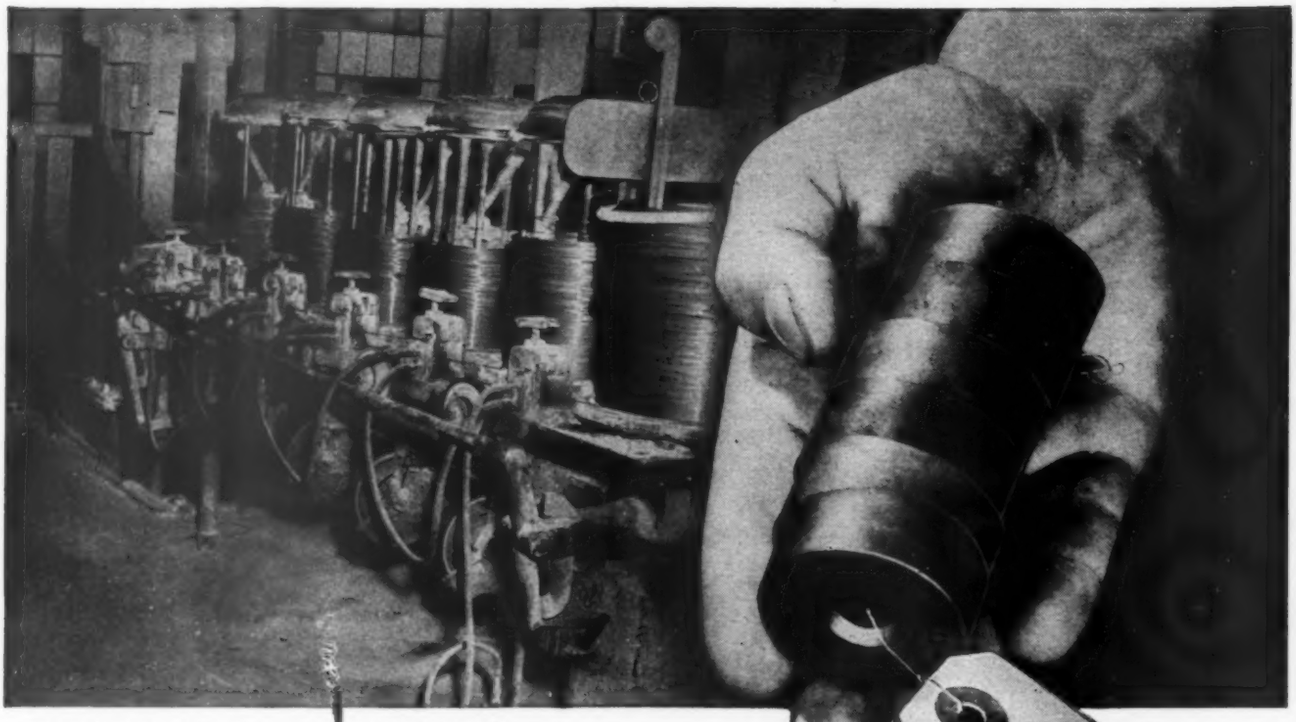

Wickwire's wire drawing dies are accurate within .0003 of an inch.

In Rope Wire too—Reducing Methods Must be Safe

Making rope wire slim and strong is as scientific as any reducing method for humans—and a lot more certain of correct results. At the Wickwire plant, the size and sequence of wire drawing dies are carefully calibrated to provide for uniform reduction and to avoid the possibility of wire becoming brittle. Skipping of drafts, another cause of wire embrittlement, is eliminated by use of continuous wire drawing machines which will not function unless all dies are in their proper place.

Drawing, cleaning, heat treatment—every step necessary to reduce Wickwire Rope Wire to final size is closely supervised. The finished wire is accurate within a fraction of a thousandth of an inch. Production of strands and finished ropes is equally exacting.

All this adds up to Wickwire Rope being the logical choice of rope users who demand the utmost in performance, safety and long life. Wickwire Rope is available in all sizes and constructions, both regular lay and WISSCOLAY *Pre*formed. Wickwire Distributors and Rope Engineers are always ready to help solve your wire rope problems and supply the right rope for your needs.

HOW TO REDUCE ROPE COSTS AND PROLONG ROPE LIFE

Thousands of wire rope users have found that the information packed in the pages of "Know Your Ropes" has made their work easier. It's full of suggestions on proper selection, application and usage of wire rope. It's easy-to-read and profusely illustrated. For your free copy, write—Wire Rope Sales Office, Wickwire Spencer Steel, Palmer, Mass.

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A PRODUCT OF THE WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

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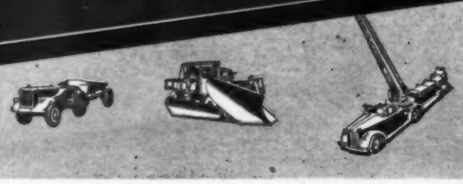
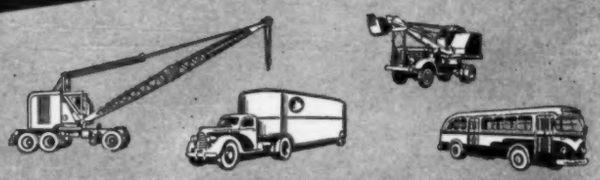
9 GOOD REASONS

for using VICKERS Hydraulic POWER STEERING





1. **FINGER-TIP STEERING** Finger pressure steers the heaviest vehicle equipped with Vickers Hydraulic Steering. Short, quick, effortless turns ease the job of parking, backing, loading and maneuvering in city traffic. On the open road there is no lag or road wander.

2. **HEAVIER FRONT WHEEL LOADING** Many steering difficulties resulting from heavy front wheel loading are overcome by Vickers Hydraulic Power Steering. It provides light, easy steering with heaviest front wheel loading.

3. **LOWER STEERING RATIOS** Present high steering ratios can be lowered substantially with Vickers Hydraulic Power Steering.

4. **LESS DRIVER FATIGUE** The Vickers Hydraulic Power Steering Unit takes all the steering strain —the driver has none. Anxiety about unsafe tires and hazardous road conditions is relieved.

5. **LIGHTER CONSTRUCTION** An over-all weight reduction can be made in the construction of steering gears, housings and columns since all stress and shock are borne by the booster unit and vehicle frame.

6. **GREATER SAFETY** Blowouts, soft shoulders, ruts, cross winds, road obstructions or sudden stops—none affect steering. In event of engine failure or damage to the hydraulic system, steering automatically reverts to direct mechanical action.

7. **SHOCKLESS** On the road or off the road, the driver feels no road shock or wheel fight.

8. **LOWER COST** Simplified installation and lowered manufacturing costs due to increased production make the price per unit lower now than ever before.

9. **ADAPTABLE** Only minor alterations needed to apply Vickers Hydraulic Power Steering to new or existing vehicle designs.

Vickers Hydraulic Power Steering has been in successful use for more than 16 years. The redesigned unit with integral relief valve has had more than a year of testing on heavy buses and trucks under most severe operating conditions.

Write for Bulletin 47-30 for full information.

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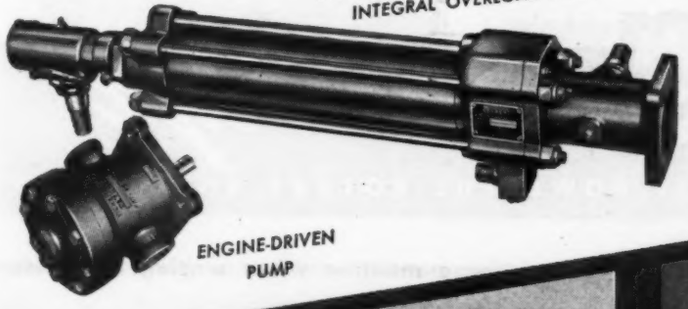

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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

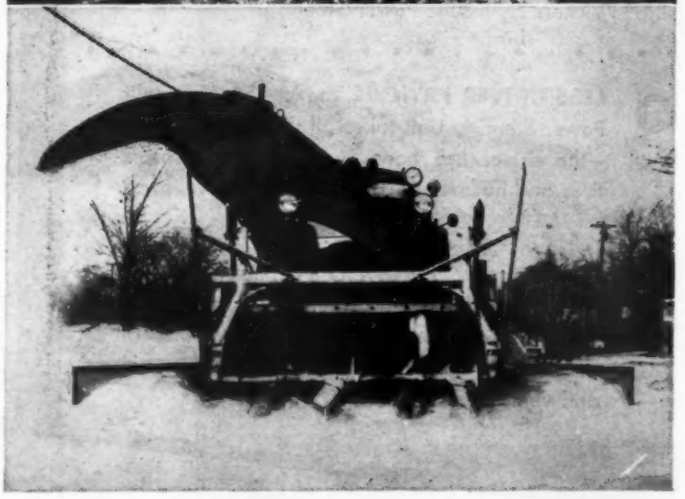
Fill a 5 cubic yard truck in 15 seconds

BROS *Sno-Flyr*
FASTEST, MOST EFFICIENT SNOW LOADER MADE

The city that owns a *Bros* Sno-Flyr gets double value. Not only is a Sno-Flyr the fastest, most powerful rotary snow plow . . . it's an efficient snow loader and widener as well.

The exclusive *Bros* feeder rake with its vertical and forward action . . . the dual rotors . . . the 170 or 275 h.p. motor . . . all these *Bros* features and more combine to quickly whip up the snow and cast it through loading chutes into haul-away trucks. In just 15 seconds, a *Bros* Sno-Flyr loads *more* snow than can be shoveled into the same truck . . . because it really packs it in. Two men operating a *Bros* Sno-Flyr remove and load as much snow in an hour as can be shoveled by 1050 men.

This saving of equipment and manpower means savings in dollars and cents. It makes a *Bros* Sno-Flyr the most economical as well as the most efficient snow removal equipment a city can buy.



Above right—While the city sleeps, the *Bros* Sno-Flyr clears streets of dangerous snow banks quickly and quietly.

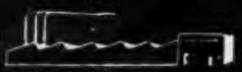
Lower right—Easily attached gathering wings provide 14-foot cutting width, are effective for sidewalk and boulevard snow removal.

WM. BROS BOILER & MANUFACTURING CO.
MINNEAPOLIS 14, MINNESOTA

BROS *Sno-Flyr*
THE WORLD'S FASTEST, MOST POWERFUL ROTARY SNOW PLOW

Your City, Too,

Can profit by snow-and ice-free streets!

Icy pavements and snow-filled streets hamper business, cause accidents to pedestrians and vehicles, endanger lives of school children. Continuous storms create fuel shortages, cut vital public services. Yet many cities now enjoy snow-and ice-free streets thanks to STERLING *"Auger-Action"* Rock Salt. It removes snow and ice, saves lives and property... keeps business and industry humming  and time, labor and money are saved with clean quick-acting STERLING Rock Salt. *ORDER NOW!* In carloads - bulk or 100 lb bags. A trained representative will gladly call. *Write Today!*

International Salt Company, Inc. Scranton, Pa.

STERLING
Auger-Action
ROCK SALT

"The MICHIGAN gives us the flexibility and mobility required in our operations. Even in the short time we have had this machine, we have found so many uses for it that we wonder how we got along without it before. Performance has been excellent and we are looking forward to years of efficient operation."

Wherever you go, you'll find users enthusiastic with praise of MICHIGAN performance, economy, operating ease and time-saving truck mobility. Talk to any MICHIGAN owner and you'll see why so many become "repeat" buyers. See your distributor for details on the entire MICHIGAN line.

MERCED IRRIGATION DISTRICT serves 164,000 acres of diversified croplands, maintains 723 miles of canals, over 5,700 structures, 50 miles of drainage channels, 106 drainage wells and a dam and hydroelectric plant on the Merced River.

MICHIGAN

MICHIGAN POWER SHOVEL COMPANY

480 SECOND STREET • BENTON HARBOR, MICHIGAN

One of a pair of Series 71 GM Diesel-powered shovels used to load fill for the site of a new office and warehouse building in Evanston, ILL. A total of 90,000 cubic yards were moved at a fuel cost of only 15¢ per hundred yards.

IF it's mountains you move—or molehills—GM Diesel power is your answer to low cost per yard moved. Not only are fuel bills low, but these engines are long-lived, durable workers that are easy to keep up. They give instant response to changing power demands—and top efficiency even during intermittent operations. Maintenance is quick and easy, too.

Whether you're buying new equipment or repowering old, it will pay you to investigate General Motors Series 71 Diesels *first*. Choose from "singles," "twins" or "quads," from 25 to 800 horsepower. See your equipment dealer, or write directly for further details.

DETROIT DIESEL ENGINE DIVISION

DETROIT 28, MICH. • { SINGLE ENGINES .. Up to 200 H. P. / MULTIPLE UNITS .. Up to 800 H. P.

GENERAL MOTORS

DIESEL BRAWN WITHOUT THE BULK

GM GENERAL MOTORS DIESEL POWER

Reserved FOR A V. I. P.

A Very Important Person! That's how Mack feels about the man who drives a truck. And that's why Mack spares no effort, overlooks no detail, in designing cabs of unequalled driver comfort, convenience and safety.

Mack cabs are big and roomy with plenty of legroom and headroom. They have easily adjustable seats. Deep and comfortable cushions. Three-point rubber mounting for easy riding. All-metal construction and non-shatterable glass.

Floorboards are insulated against heat and sealed tight against gas or drafts. Ample fresh air circulation assured through large cowl-type ventilator. Rotary door latch closes to finger-tip pressure. De luxe fittings include dome light, arm rest, large felt-lined dash compartment, full lining in attractive leatherette, and handsome, modern instrument panel.

You'll find, too, that Mack cabs have a lot more than meets the eye. They're built to the same quality standards as Mack trucks . . . in the same factories . . . and by the same master truck builders. This rugged Mack construction assures in-built durability . . . means that Mack cabs stay new longer — stay more comfortable longer.

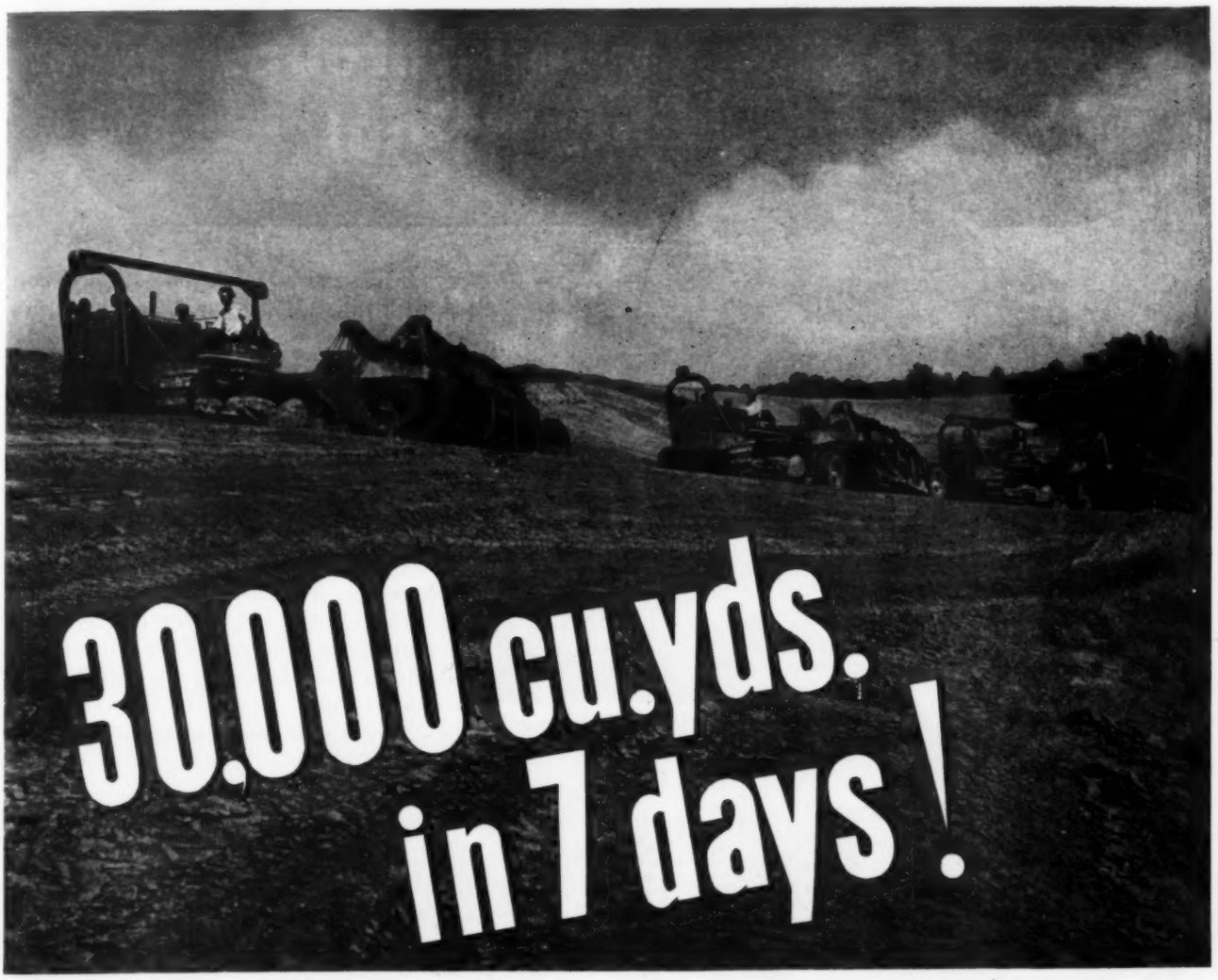
Mack

since 1900, America's hardest-working truck

Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts. In Canada, Mack Trucks of Canada, Ltd.

Trucks for every purpose

6194



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Heil Cable Scrapers have a reputation for moving more dirt, faster and at lower cost. They earned this reputation the hard way, on just such jobs as this Mississippi River levee. Only three Heil Cable Scrapers were required — two eight- and one ten-cu. yd. units — to move 30,000 yds. of heavy gumbo in one week's time. This is earth-moving at its best — made possible by the following Heil features:

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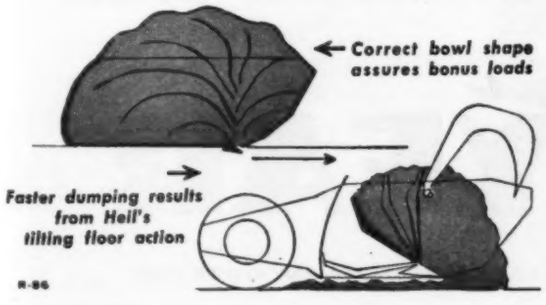
R-86



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GOODYEAR

MORE YARDS ARE MOVED ON GOODYEAR OFF-THE-ROAD TIRES THAN ON ANY OTHER KIND

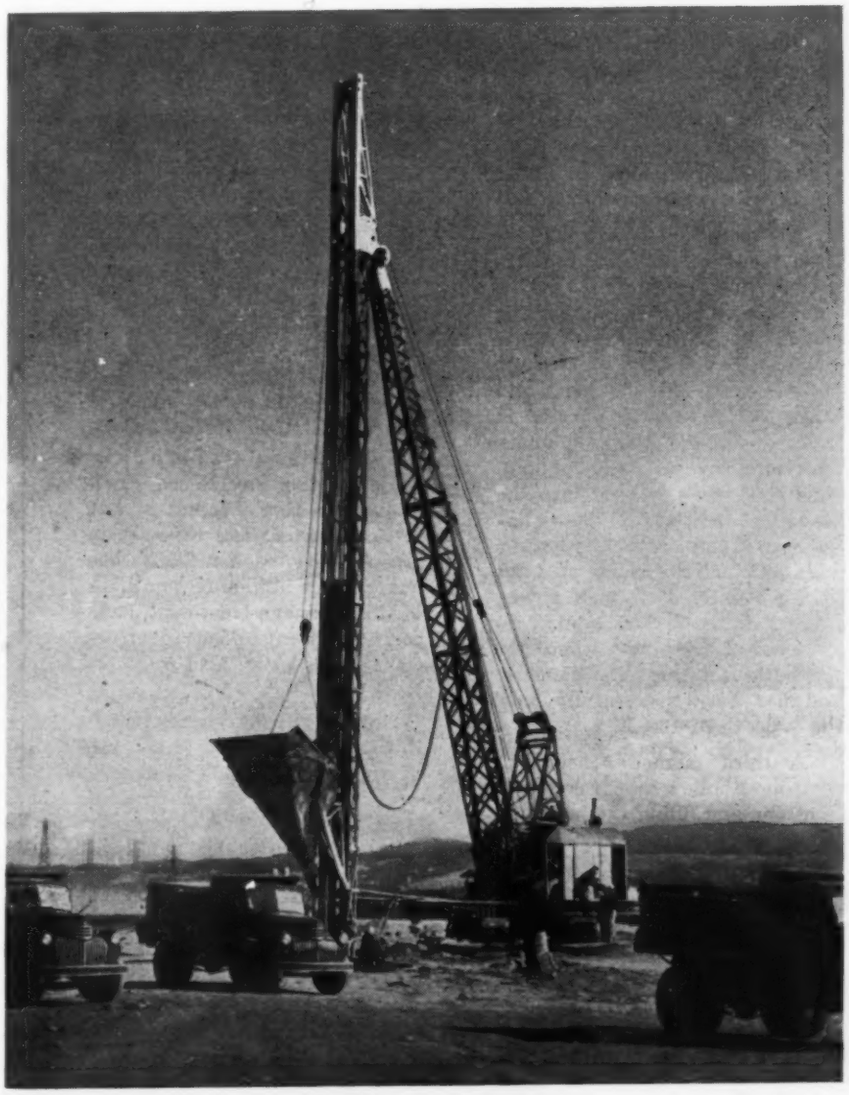
ROADS AND STREETS

DECEMBER, 1947 • VOL. 90 • No. 12

"Sand Piles"

Hasten Completion of California Expressway

Macco Corporation & Morrison-Knudsen Company, Inc., build 5-mile $3,250,000 relocation of Bayshore Freeway along San Francisco Airport. Plugged hollow mandrel driven by pile driver employed to build 235,000 lin. ft. of vertical drains. Borrow placement reached 50,000 tons daily at peak



★ General view of the sand drain construction operation—2½-yd. crane with 80-ft. pile driver leads; operator in act of hoisting sand skip to load through Y intake at top of hollow plugged mandrel

By H. A. Simard

Associate Highway Engineer, California Division of Highways, San Francisco

THE grading and paving of a five-mile portion of the Bayshore Freeway between South San Francisco and Broadway Avenue in Burlingame, one of the largest single contracts ever let by the California Division of Highways, ($3,250,000), is progressing at a rapid rate with completion early in 1948 assured.

This freeway is being constructed as a 6-lane divided highway, representing a relocation around the expanded Mills Field airport and replacement of an over-crowded 4-lane undivided roadway. The 36-ft. division strip is sufficiently wide to provide for two additional traffic lanes when traffic conditions justify. The pavement under this contract consists of two separate roadways 36 ft. in width surfaced with 4 in. of asphalt concrete on 8 in. of crusher run base.

Mud Depths Overcome

In general, the project traverses reclaimed marsh and tidelands which have been used for cattle grazing and hay crops. Underlying these reclaimed lands are mud depths varying from 0 to 60 ft. so that throughout most of the project very unstable

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As described in July-August, 1947, "California Highways and Public Works." Photos by the editor of "Roads and Streets."

foundation conditions were encountered. Embankments for the new highway average 7 ft. height. In order to accelerate the anticipated settlement of embankments throughout unstable areas, an overload of 2-ft. above profile grade was specified. This overload was to be removed after a minimum waiting period of 30 days in order that the subgrade could be prepared for the pavement.

In some of the deeper mud areas and at the approaches to proposed traffic interchange structures, the sand drain method for consolidation of the underlying mud has been used. In other structures locations or approaches where mud depths are less than 20 ft., mud was stripped before placement of embankment material. Where no foundation treatment was specified the embankments were placed on the original ground at a slow rate so that it would consolidate without being displaced.

Sand Drains Necessary

The sand drains consisted of vertical holes 18-in. diameter extending to relatively firm bottom and backfilled with a carefully graded sand.

Vertical Sand Drains—what they are and how they are constructed

AS described by O. J. Porter, consulting engineer, last winter in Chicago at the American Road Builders' Association's "Town Hall Meeting on Airports," vertical sand-drains are designed to cause the water to escape from saturated materials as an overlying fill or load is applied, thus consolidating the soft material in-place, without causing the lateral displacement which would occur without special treatment. Mr. Porter's comments follow:

The time required for this stabilization process varies as the square of the distance the water must travel, through the muck to escape. In other words, where a 5-foot layer of soft material, under a pervious embankment or base, will stabilize during a construction period of, say, one year—a 50-foot layer, without vertical drains, requires approximately one hundred years, to reach the same state of equilibrium.

In deep layers of mud, vertical sand-drains are installed on spacings which will provide drainage channels and drainage conditions comparable to that for thin layers. This discussion assumes that the foundation material is homogeneous. Fortunately, this is not generally true. Fine materials, when laid down in water, usually segregate, resulting in greater permeability horizontally than in a vertical direction. Sand-drains are also designed to take full advantage of this phenomenon. Because of these facts, it is possible to stabilize thick layers of compressible foundation materials in three months to a year, thus obtaining most of the settlement during the construction period.

Four Methods Compared

Four distinctive methods have been developed during the last decade for rapidly installing sand-drains. On test installations, in 1934, holes 20 to 24 in. in diameter were excavated with a rotary bucket, and then immediately backfilled with sand. This method was later utilized on five construction projects to depths ranging to 70 ft. Casings were not used with this method. Where the ground tended to squeeze in during excavation, it was found that the holes could be kept open until drilling was completed, by filling them with water.

The second method, which has been used extensively, consists of driving a plugged hollow mandrel, and then filling the mandrel with sand (see preceding article). The mandrel is next sealed at the top, and then air or water is injected in the top of the mandrel, under pressure, to assist in pulling, and to expel the sand into the hole as the mandrel is withdrawn. The plug on the bottom of the mandrel consists of a flat plate connected in such a way that it turns on edge, and is recovered for re-use when the mandrel is extracted. This method has been successfully used to a depth of 100 ft.

A third method consists of jetting a hollow mandrel to firm bottom, and filling the hole with sand as the mandrel is withdrawn.

In the fourth case, the hole is cut with a high speed rotary bit, and a jet. The liquefied material is then removed from the hole with a pump, prior to installing the sand.

The best method, of course, depends upon the depth of the holes, and the nature of the ground,—and numerous variations in the assembly of the equipment may be made for each method.

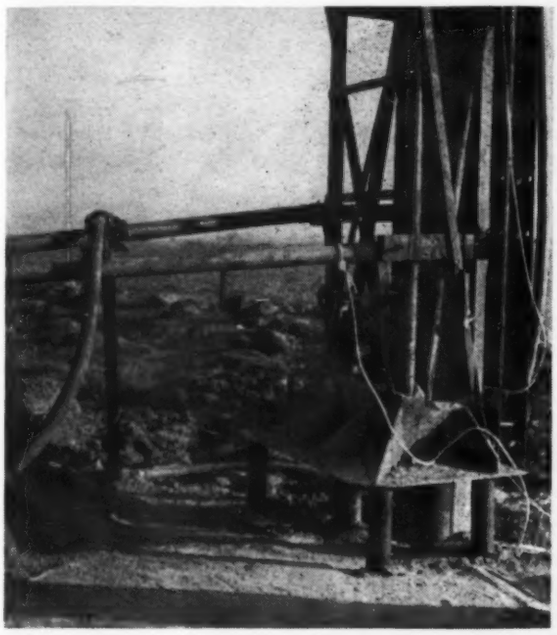
Used Since 1935

Since 1935, vertical sand-drains have been utilized to stabilize embankment foundations to depths of 20 to 70 ft. on twelve California State Highway projects. These included five in Delta regions where the mud consisted of organic and peaty material, and where the foundations were compressed 4 to 20 ft. during construction, without displacing the adjacent ground. The other projects were over less organic marine silts and soft clay strata, which compressed 2 to 10 ft. during the stabilization period. The embankments on these twelve projects ranged from 4 to 70 ft. in height. Observations since construction, and low maintenance costs on the projects have proven the economic value of this special type of treatment.

Two additional California projects—the Bay Shore Freeway near San Francisco, and the Terminal Island Freeway in Los Angeles, each utilizing one quarter of a million feet or more of this drainage treatment, have recently been under construction. [This issue; also Aug. '46, R&S.]

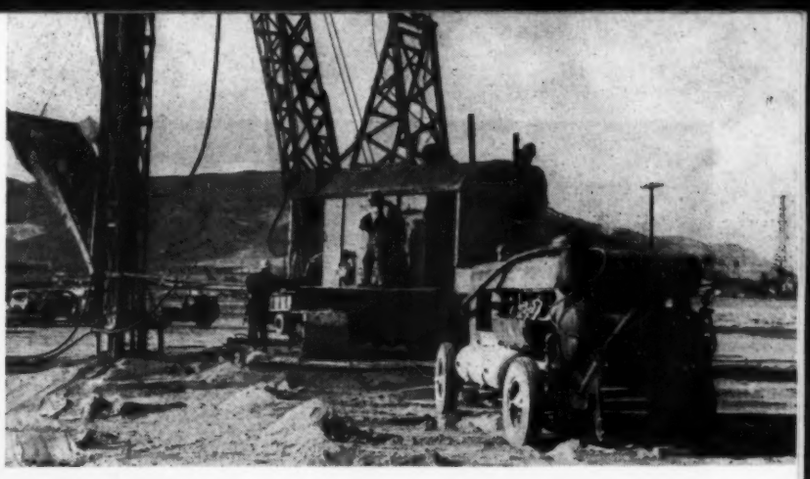
During World War II, sand-drains were installed to a depth of approximately 100 ft. in soft, gray, silty clay, to stabilize the South quay wall at the Navy Yard, Mare Island, California. Thousands of drains were also utilized in the foundations for heavy earth-filled sites for barracks, road, and railroad grades at the Port Chicago Naval Ammunition Depot on the South side of Suisun Bay, California.

1 Air for driving pile hammer and for injecting in mandrel top to aid its extraction, was provided by a large portable Gardner-Denver compressor



5 Skip raised and hoisted nearly to mandrel inlet

6 Here the skip is fully hoisted an dthe sand is being deposited in the mandrel. Note that the hinged throat or spout has been pulled in to pouring position, which the crane operator accomplishes simultaneously with opening hopper, by means of a trip rope



2 Details of the base especially built for the leads

3 Sand loading skip being filled—beginning of operating cycle

4 Loaded skip being hoisted. Note how skip is hinged to a frame which slides up and down the lead frame

Step by Step

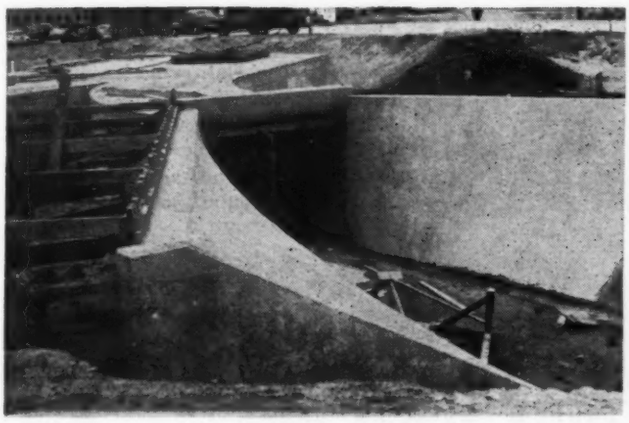
How Sand Drains Were Constructed Using Hollow Plugged Mandrel

For the toughest drainage jobs
Specify reinforced concrete pipe

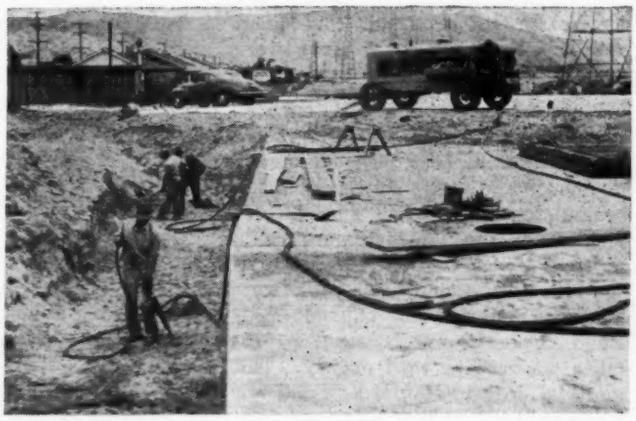
You find all the qualities needed to provide drainage for highways, streets, airports and railroads in concrete sewer and culvert pipe, reinforced with welded wire fabric.

The closely, evenly spaced cold drawn steel wires distribute adequate strength, throughout pipe of sufficient diameter, to provide maximum hydraulic capacity. You are also assured of long life and low maintenance cost, for storm and sanitary sewers, when you use concrete pipe of any size, reinforced with welded wire fabric.

Remember, not only in pipe, but in every type of concrete construction there are places where the most practical, the most economical reinforcement you can use is Welded Wire Fabric.



★ One of the large multiple box culverts required to carry airfield drainage under the Bayshore Freeway. Note attractive appearance of warped wingwalls



★ Pneumatic tamping of backfill was required around structures

Firm bottom is generally defined as material having a moisture content of 25% or less. The drains, placed on 10-ft. centers (a drain for each 100 sq. ft. of fill area), are expected to provide a means of relief for the subsurface water as the fill loads are increased, thus permitting consolidation of the mud during construction, a consolidation which normally would continue after completion.

The estimated 235,000 lin. ft. of drains varied in depth from 15 to 60 ft. max. in the deepest marsh areas.

The method of installation consisted of driving an 18-in. diam, mandrel equipped with a bottom plate to required depth and introducing sand backfill by means of a hopper at the top. Air under pressure of 100 p.s.i. was then admitted at the top and as the mandrel was withdrawn, the backfill material was forced past the free hanging bottom plate and into the hole.

Driving of Mandrel

Driving of the mandrel was accomplished by means of a crawler-mounted 2½-yd. Lima crane, with 6 ft. extra length added to the crawler tracks to take care of counterbalance, the crane having 80-ft. leads and an air-driven hammer. Prior to placing sand drains, it was necessary to place a "working table" of selected material to a thickness of from 2 to 3 ft. over the marshes, to provide support for this equipment. It was still necessary to use heavy timber mats in the deeper mud area.

After the completion of sand drains in each area treated, the next order of work was the placing of a 12-in. layer of sand fill material over the entire width of fill at the tops of the vertical drains. The purpose of this blanket is to provide a means of release for the subsurface water brought up through the vertical drains. Embankments were constructed by placing subsequent lifts of selected material on the sand blanket.

The maximum rate of embankment construction was limited by specifications to 1 ft. per day and 3 ft. during any one week. The actual rate of loading in the areas treated with sand drains was determined through observations of results obtained by means of settlement platforms and pore pressure installations.

Marsh Land Problems

The settlement platforms, 3' x 4'3", were placed on the original marsh prior to the start of construction. A section of iron pipe was attached to each platform with the top of the pipe kept above the top of the fill by the addition of lengths as the fill heights were increased. The rate of settlement and total consolidation are readily obtained by means of elevations taken on the tops of the pipes. Permanent installations are planned which will permit future observations after completion of the project.

Hydrostatic pressures developed at various depths in the marsh areas underlying the embankments are observed by means of equipment designed and provided by the Division of Highways material and research department.

Briefly, these pressure measuring installations consist of well points driven to the desired depths and connected to compound gauges outside the toe of the fill by means of iron pipe and copper tubing.

Pressures as high as 10 p.s.i. developed during loading of the embankments, gradually decreasing to normal as the subsurface water was released through the sand drains and drainage blanket.

Material Imported

By correlating the rate of consolidation, as determined from the settlement platforms, with the pressures developed at the well points, the rate of application of additional lifts was determined, with the result that ex-

★ Skip again lowered and mandrel withdrawn from hole. Excess sand over top of completed vertical drain

★ Dixson wagons at special 100,000-lb. scale platform, constructed near borrow pit to measure payloads paid for on tonnage basis

cessive pressures (and consequent later displacement or failure) were largely avoided.

Since the area traversed is marshy, with no suitable material available for the embankment, it is necessary to import material. At the time the preliminary report and special provisions for the contract were being written, Macco Corporation & Morrison-Knudsen Company, Inc., were hauling material to expand Mills Field Airport from a borrow pit three miles west of the road project. This material deposited on Mills Field was being paid for by the cubic yard from cross-section measurements of the borrow pit.

50,000 Tons of Borrow Per Day

It appeared likely that this same construction company would be able to submit a favorable bid for this freeway. It was, therefore, decided to pay by the ton for the approximate 2,000,000 cu. yd. of borrow required in order to accurately segregate the material going to two jobs from the same source.

The maximum amount of borrow hauled in any one 18-hr. day was 50,000 tons. Material was hauled in large dirt moving units composed of Euclids netting 22 tons, Dixon wagons netting 25 tons and Peterbilts netting 47 tons. These units were loaded at the borrow pit with 2½-yd. Northwest diesel and 6 yd. Bucyrus Erie electric shovels. Rooters were used at the pit to loosen the material which was then pushed to the shovels with D8 Caterpillar tractor dozers. The maximum number of equipment units used at any one time was 35 Euclids, 18 Dixon wagons and 25 Peterbilts which were being loaded with three 6 yd. electric and two 2½ yd. diesel shovels.

There are a number of large drainage structures on the project, the largest being constructed as part of the proposed system planned by the City of San Francisco to keep drainage waters away from the airport. A canal to collect is proposed all along the western side of the freeway between San Bruno Avenue and Millbrae Avenue, a distance of 2½ miles. This canal system crosses under the freeway through two triple 10' x 8' r.c. culverts. There are also two large reinforced concrete boxes, 7' x 6' to carry utilities.

The project is being constructed under the supervision of Jno. H. Skeggs, district engineer; R. P. Duffy, district construction engineer; and H. A. Simard, resident engineer, representing the California Division of Highways. Macco Corporation & Morrison-Knudsen Company, Inc., are represented on the job by O. H. Tucker, project manager, and George Haensel, general superintendent.

Sand Drains Used on Eastern U. S. Projects

Vertical sand drains have figured with increasing frequency in project news on the Eastern seaboard, having been specified or contemplated for airfield work in the New York area, for road projects in Connecticut, and for freeway construction in New Jersey.

New Jersey's first road grading contract to include vertical sand drains for marshland consolidation represents a saving of $667,144 as compared with the low bid under excavation and fill methods, according to state highway engineer Charles M. Noble. With the additional 160,000 cu. yd. of overland material required for the sand drain method, and which can be utilized at a later date on an adjoining contract, the net saving is estimated at $750,000.

The contract awarded in September was for 1.2 miles of grading on the state's first freeway, Route 100, in Union County; low bid of $1,253,833 by the Construction Aggregates Corp., of New York, for the initial application of the design in this state.

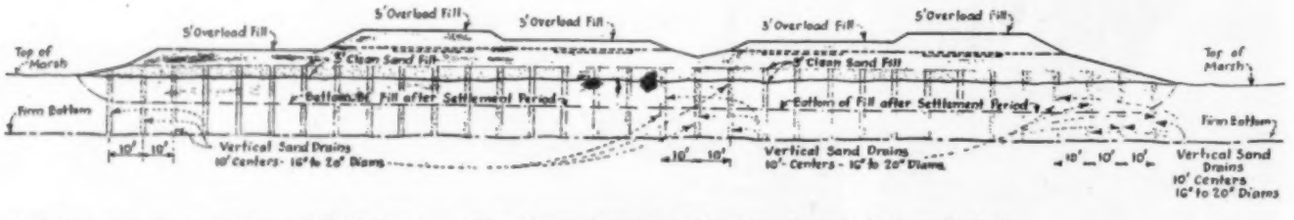
The contractors were permitted to bid on the Alternative Method "A" providing for 927,000 cu. yd. wet excavation; 1,268,000 cu. yd. borrow excavation; 56,000 cu. yd. channel excavation; and the Alternate Method "B" which called for 821,000 cu. yd. borrow excavation; 340,000 cu. yd. sand blanket; 304,000 lin. ft. vertical sand drains; 95,000 cu. yd. channel excavation.

The borrow required for Alternate "B" is 100,000 cu. yd. less than for Alternate "A" because it was estimated that the muck would be compressed 50% under the sand drain method while Alternate "A" required complete removal of the mud and replacement with borrow.

Only one firm submitted proposals under method "A" and this was the Eastern Engineering Co., of Atlantic City, at $1,920,977. Other bidders under "B" were Geo. M. Brewster & Son, of Bogota, $2,011,305; and S. J. Groves & Sons Co., Woodbridge, $2,212,127.

The Route 100 work will require the placing of 18,000 units of sand drains of 18-in. minimum diameter and 8 to 24 ft. depth, spaced 10 ft., apart in both directions.

O. J. Porter, consulting engineer, New York City and Sacramento, California, acted as consultant during the preparation of the plans for the sand drain design.



★ Typical cross-section of Route 100, Section 4, in New Jersey, showing application of sand drain method of stabilizing marshy land during embankment construction

How Washington State is

Putting Radio to Work

100 mobile 2-way FM Units helping meet winter emergencies and speed routine highway maintenance

By Gordon R. Newall
Washington State Department of Highways, Olympia

WITH the roar and swish of a speeding express train it came. An avalanche of wet snow rolled down from the upper levels of the Cascade Mountains and in a few seconds a cold barrier weighing many tons had made a snow-walled prison of 4,061-ft. high Stevens Pass in Washington state. To the forty shivering travelers marooned in the two and a half-mile canyon formed by the cutoff section of Primary State Highway No. 15, that cold February day looked like the beginning of a long and trying experience if not an actual tragedy. They had no shelter except their cars, no food, no protection against the midwinter mountain cold, and the communications lines were down.

Yet within a few minutes help was on the way. A ski patrol, fully informed as to the number and physical condition of the trapped motorists, arrived at the scene with food, stimulants, blankets, and other needed supplies within an hour and big rotary plows were gnawing at the snow barriers in even less time. Within eighteen hours the last slides were cleared and the group was on its way.

Panic Averted

And what's more, the slide victims knew that help was on the way a few moments after the slides occurred. That comforting knowledge averted panic before it could get started. Those who knew friends and relatives

★ Rotary plow on Chinook Pass, May, 1947

★ Transmitter building at Ellensburg, Wash.

★ Two-way radio equipped rotary plow. (Note microphone in operator's hand)

★ Supervisor reporting progress of maintenance work via two-way radio

would be worrying were able to send messages of safety from the mountain pass as soon as they knew their situation was not dangerous.

How was all this accomplished? By two-way radio-telephone, part of the everyday working equipment of the Washington State Department of Highways. Two of the marooned group were state highway department maintenance men, had two-way radio units in their cars. With the speed of light, district maintenance engineer Richard Linton had the full story from them and was able to organize rescue operations with a minimum of delay.

With three major passes across the high Cascades the only highway links between eastern and western Washington, the Department of Highways finds its radio network particularly important in keeping the cross-state traffic lanes clear during the snow season, but highway director Clarence B. Shain says the high speed communications equipment has proven its value in routine maintenance operations in all parts of the state.

Fifteen strategically located FM radio stations link nearly every section of the state in the department of highways' radio net. Nearly a hundred mobile units are mounted on snow plows, trucks and administrative cars. The "brain center" is in Olympia at state headquarters, where a 2-mile telephone to the suburb of Tumwater actuates a 250-watt transmitter. This remote control transmitter, located on a high hill surrounded by huge Douglas fir trees can send direct messages as far east as Goldendale and Wenatchee, airline distances of over one hundred miles. Plans are underway for a series of cross-state repeater stations to make direct communication between Olympia and Spokane possible. The 360-mile jump across the Cascades will require signal reinforcement at Snoqualmie Pass (the major cross-state highway route over the mountains) and at a high point in the Columbia Basin of eastern Washington. These repeater stations will be put into operation by the radio wave itself and no personnel will be required to man the remotely controlled transmitters.

Examples of Lives Saved

Washington's highway radio system has averted possible death, as was the case last winter when a ten-ton pusher plow was caught in a snowdrift in 20-below zero weather. The operator left his cab to repair a damaged fuel line and in a few moments the numbing cold froze his hands. He crawled back into the cab, grasped the microphone with stiffened fingers and called for help. Thanks to radio, it came in time to save his hands and very possibly his life.

Radio has served the citizens of Washington in unusual ways, such as the time a rock slide in a steep cut impounded cars carrying school children to a music contest. A section man at the cut immediately radioed district superintendent Vic Marshall at Ellensburg, who saw to it that the children's parents were notified at once that their children were safe and uninjured. To complete the job to everyone's satisfaction, Marshall consulted with school authorities and soon radioed back to the relieved and happy children in the slide area that arrangements had been made to postpone the contest another day.

But most important, as director Shain points out, is radio's everyday, practical use in highway maintenance. Whether it's a slide, a bridge out, a flash flood undermining the right of way, or any of the hundred and one things that can tie up traffic on a 10,000-mile network, the traffic lanes are guarded efficiently via the radio lanes. The maintenance man on his lonely beat is as close to the main office as his dashboard microphone. He can request emergency equipment without leaving the scene of the trouble, and headquarters can have it rolling in minutes.

The people who build and maintain the highways in Washington are glad they have a state-wide two-way radio net, and so are the people who use those highways. It has proven itself a wise investment in safety, in convenience and in efficiency. Highway radio is here to stay in Washington state.

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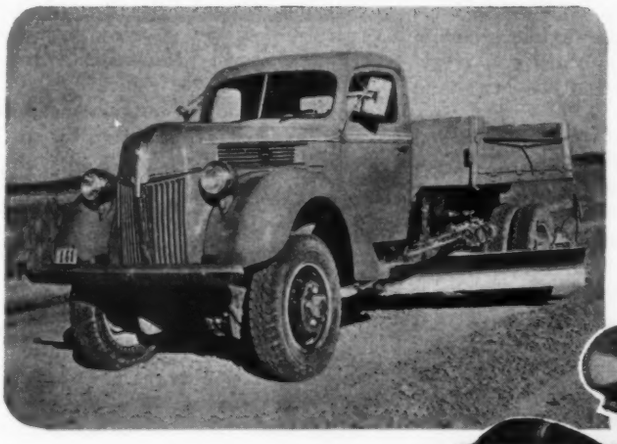

Top: Marmon-Herrington Heavy-Duty *All-Wheel-Drive* Truck.

Bottom: Marmon-Herrington *All-Wheel-Drive* Converted Ford.

No hill too steep—no sand too deep—no going too rough and rugged . . . that's the story wherever you find Marmon-Herrington *All-Wheel-Drive* Trucks at work.

Marmon-Herrington *All-Wheel-Drive* Trucks, are "made to order" for road and street work. Here are trucks with virtually the tractive power of crawler tractors—yet many times as versatile and fast. Here are trucks you can depend on to carry men, materials, equipment—*where you want them, when you want them . . . swiftly, safely, surely.*

Marmon-Herrington Heavy-Duty *All-Wheel-Drive* Trucks are available in 4-wheel-drive and 6-wheel-drive models—rated gross capacities up to 42,000 lbs. Converted Fords are available in all standard models, both 4-wheel-drive and 6-wheel-drive—capacities up to 22,500 lbs.

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EDITORIAL

★ Contractors and Construction Safety

The 1947 Congress of the National Safety Council was attended by some twenty representatives of contracting organizations. A piddling twenty men, scattered throughout a total Congress attendance of 10,000 people. The public utility companies alone sent about 500 representatives.

Is this the measure of the value contractors attach to employee safety? We hope not. In fact we know that many contractors today are quite safety minded, having found that accident prevention pays off in money saved and work expedited. But good attitudes and intentions are one thing, and good ideas for making employees play the safety rules every hour of every day are another.

And while most contractors realize that safety work is vital, the laggards still run their jobs carelessly.

Contractors who haven't availed themselves of the Construction Detail Sheets and other construction safety material of the National Safety Council, certainly are missing a ready and inexpensive source of valuable ideas.

★ Unhobble Truck Transportation

While driving through Georgia this fall we were greeted by road signs saying, "Auto speed limit 55 mi. Trucks 35 mi. if Gross Load over 16,000 lb." Maybe that isn't the exact wording, but you get the idea. All the way across the state we took our place in long queues of autos, single-filed behind trucks whose drivers were holding to this horse-and-buggy limit.

We haven't inquired as to whether this particular 35 mile limit owes its origin to railroad lobbying, or fear on the part of state highway people that the state's roads still aren't sufficiently developed to permit a faster truck limit. Or perhaps it's just an old law still on the books from bygone decades.

At any rate, unreasonable truck limitations in Georgia and elsewhere must be lifted. The policy of state highway departments and state legislatures should be to give highway trucking its head as fast as safety will permit. The part that trucks play in distribution of goods today is so vital that no state can afford longer to continue to hamper their operation. The inconvenience to the individual motorist, resulting from having two speed standards in one traffic stream, is of small importance alongside the larger issue of efficient distribution of goods.

Should Flow with Traffic

Heavier trucks, however, as well as inter-city buses, should flow with traffic whenever possible. Manufacturers are making trucks constantly more powerful and roadworthy, with ability to cruise with full legal loads at 50 to 60 mph. wherever road conditions and laws permit. Builders of house trailers, incidentally, are the worst offenders at the moment—these lumbering vehicles while far more mobile than a few years ago are still creating bottlenecks on the busy two-lane highways.

The truth is that truck weight and length regulations are still far from uniform among the 48 states. Truck taxation is mixed up with the questions. For example, trucking interests in California and certain other states have fought bitterly against any and all highway proposals that have included higher taxes on truck ownership or use. (No one knows just how a truck should be taxed, so why shouldn't truckers resist?)

Truck and trailer designers, on the other hand, are still evoking new over-the-road models that obsolete their predecessors in speed, load capacity, efficiency and road-worthiness. In New York recently one speaker at the AASHO convention chided motor vehicle manufacturers for failing to consult highway engineers before coming out with new designs. Would we have our almost miraculous modern motor vehicles today, had this been done?

Trucking Still Growing

All this is a reminder that we are still in a period of vast expansion in highway development and highway transportation. Everyone engaged in any part of it must take the broad view. Whether it is economical or not, we foresee in a decade or two that our highway system will be carrying more and heavier and faster trucks—yes, and possibly with heavier axle loads. Mechanical development of the motor vehicle has forced wholesale roadway obsolescence in the past, and may continue to do so.

The AASHO after long and intensive investigation has adopted a recommended code of maximum dimensions, weights and speeds of highway vehicles and we've seen a beginning toward actual uniformity especially with respect to axle load maximums. A recent resolution by the Association urges that all states go after their state legislatures to adopt these recommendations. In any event, greater effort must be made and soon, to get the "bugs" out of truck transportation. Meantime there is a need for better facts on trucking economics and better factual presentations to aid state legislatures. Perhaps motor vehicle makers and highway leaders can get together oftener.

Perhaps also some day there could be a harmonious joint committee action between truck owner associations and highway departments, so that both factions can present a united front in taking transportation needs to the people and the legislatures.

★ Woo them in High School

Out of the welter of ideas erupting from the AASHO convention, here's another one that will bear further consideration. Why not, said a fellow whose name we didn't get, go after high school seniors in a program to interest them in a highway engineering career?

Well, why not? The "sidewalk superintendent" instinct is strong in these youngsters. Excursions or informal trips to visit the exciting and sometimes spectacular road jobs to be seen nearby would be one phase. Who knows what seeds of inspiration might also be planted through dramatization of the functions of our highway system and its importance in our economic life. Diorama, models, artists' visualizations, colored movies of earthmoving, etc.

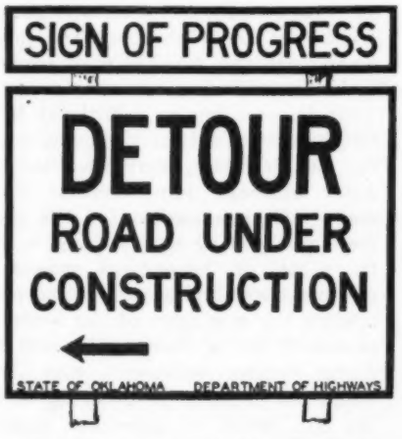
Of course, some pessimist might say, yeah, fine idea, but it's not going to hide the fact of the low pay. Our counter would be that disparities in pay between highway department engineers and other private professional and business jobs will lessen as time goes on. The white collar squeeze right now is a transitional thing, born of postwar inflation and reminiscent of 1917-20.

Meanwhile here's an idea that ought to be taken up with every high school in your state. Maybe the contractor association could help with arrangements.

Oklahoma's New Traffic Sign

Detours and construction jobs have been put to the novel task of advertising Oklahoma's highway program by State Highway Director H. E. Bailey.

Warning signs posted at such locations have been revamped with the addition of a panel board inscribed with the comforting wording of "Sign of Progress."



"Believe it or not," Director Bailey says, "we now receive many letters from motorists who say that they used to cuss when a sign directed them to a detour or sent them over a rough shoe-fly. They tell us now that the addition to the sign has become really soothing and that they endure the inconvenience and roughness of a detour in a pleasant frame of mind after realizing that we are bettering travel conditions."

•

Toll Bridges in U. S.—In 1945 there were 205 toll bridges and 7 toll tunnels operating in the United States. Since 1940, 6 new toll bridges have been opened to traffic, 41 toll bridges were eliminated and 11 toll bridges changed from private to public ownership.

Employee Training Data Compiled by Oklahoma Department

How are the state highway departments set up for employee training?

Carl R. Reid, Engineer of training in charge of the new division established in the Oklahoma department of highways, has compiled enlightening questionnaire data on the subject.

Only fifteen states (including D. of C.) now conduct employee training, five of which list only G.I. This represents little or no gain over former years. Only two departments report that all technical personnel receives training (Arkansas and Colorado).

While the data are somewhat incomplete, it is indicated that training when done is confined almost entirely among materials, testing and lab men. Among the specific comments made in reporting, the following are representative:

Alabama—Inspectors work in lab to learn tests.

Delaware—3 to 5 days in winter, all field men.

Indiana—1 or 2 day refresher course, winter, fieldmen (Purdue Short Course).

Kansas—Follow-up refresher within year.

Massachusetts—Conference various times, 2 days, on new methods.

Ohio—New general training course being organized.

Pennsylvania—Construction forces, each division in spring.

S. Carolina—Varied assignments at beginning.

•

Note that centerlines with carbon black troweled into the concrete (as in Indiana on U.S. 52) usually start to ravel in two or three years. Better stick to paint stripes, is this observer's notion. Concrete apparently doesn't like the over-manipulation involved.

•

Everyone will be glad when some of those old worn-out asphalt pavers are retired in favor of new ones. We drove over a stretch of newly placed hot-mix resurface near Houston this year that rode a bit rough.

•

Neglect of shoulder maintenance along busy arterials is still a national crime against safety on the highways. Ruts and slab-edge exposures developed during rains ought to be smoothed by 24-hour-a-day, going-to-a-fire methods.

•

Large Aerial Survey Contract

One of the largest highway aerial topographic survey contracts ever given out by other than Federal Government authority has been awarded to Aero Service Corporation, Philadelphia, Pa., by Gannett Fleming Corddry and Carpenter, Inc., Harrisburg, Pa., contract designing engineers for the Pennsylvania Turnpike Commission. The survey, which is for the eastern extension of the Pennsylvania Turnpike, will be one mile wide, and 141 miles long and covers one of the proposed routes of the 4-lane toll road. The topographic map will be on a scale of 1 in. equals 200 ft., with 5 ft. contour intervals.

•

Urban Highway Improvements Lag.—Urban highway improvement is lagging behind other phases of the Federal-State postwar road program, new Public Roads Administration figures show. Only 17% of Federal funds available for the city improvements have been contracted for, while the percentage for primary roads is 40% and that for the secondary system is 33%.

Extra Lanes For Trucks Cut Down Hazards

A SPECIAL truck lane for northbound vehicles has apparently cured a traffic hazard on U.S. 5 in Connecticut. This hill (near Wallingford) has long been a problem. It is a section of highway almost a mile long, with 7% maximum grade. The lower end is on a tangent, while the upper section is on a two degree curve. Near the top of the hill it is joined by another road.

★ Start of construction on extra truck lane, U.S. 5, Broad St. Hill, Wallingford. View toward Meriden 1946

★ Completed extra truck lane, U.S. 5, Broad St. Hill, Wallingford. View toward Meriden 1947

Prior to present widening, according to a Connecticut state highway bulletin, the pavement consisted of two 10-ft. lanes of concrete. This narrowness of the road plus its length, its steepness, its curved section, and the intersecting road at the top,—all combined with 8000 daily traffic count—resulted in one of the worst traffic hazards in the state. Many drivers, becoming impatient of slow cars ahead, would pass with too little regard for their own safety or that of opposing traffic. Heavily laden trucks, however, forced to an abrupt loss of speed by the grade, were the most serious menace. The drivers of following passenger cars, not quickly enough aware of the change in pace, would run into them, particularly at night. Several fatal accidents occurred in this manner.

During the winter months, when pavements became slippery because of sudden ice storms, trailer trucks moving up the hill sometimes jack-knifed and completely closed the road. In a very few minutes a large traffic jam would result and sand trucks would be unable to get to the hill for sanding work.

When war restrictions were relaxed, several plans for improvement involving relocation and rerouting were considered, but were abandoned because of the high cost. The most economical and feasible plan seemed to be the widening of existing pavement by creating an additional lane for the particularly slow moving traffic. Last summer, work was started. After drainage improvements were made and irregularities of the concrete removed by mud jacking, a 12-ft. width of bituminous macadam pavement was laid adjoining and paralleling the east edge of the concrete pavement for a distance of 4000 ft. Stone surface treatment was then given the concrete in order to make the full width of pavement appear the same. Suitable markings were painted on the highway, separating the lanes, with the words "Truck Lane" in large letters printed at the beginning of the new lane. Signs, also, were posted directing truck drivers to use the truck lane.

This installation has proven a success. Trucks and other slow moving vehicles are keeping within the truck lane, leaving an unobstructed lane for fast moving passenger vehicles. There have been no accidents reported since construction, and during ice storms last winter there were no traffic tie-ups reported at any time.

NOTE WHAT INTERNATIONAL TRUCKS OFFER

1. **A Truck of the Right Size and Type for Every Job.**
2. **Performance-Co-Ordination.**
3. **Load-Co-Ordination.**

Yes, International Trucks are money-makers on construction jobs for the three compelling reasons listed above.

They're Performance-Co-Ordinated. That means they're expertly fitted to their jobs. And that in turn means rock-bottom operating economy and long, trouble-free service.

They're Load-Co-Ordinated. And that means an expert recommendation from your International Dealer or Branch about the exact amount of payload *most* profitable for *your* trucks on *your* jobs.

International Load-Co-Ordination is based on the International Truck Point Rating System—exclusive with International—and a scientific system—(Note that!)—not guess work.

So no matter what your truck problem, see your International Dealer or Branch—for the right trucks, expertly Performance-Co-Ordinated and Load-Co-Ordinated to *your* jobs.

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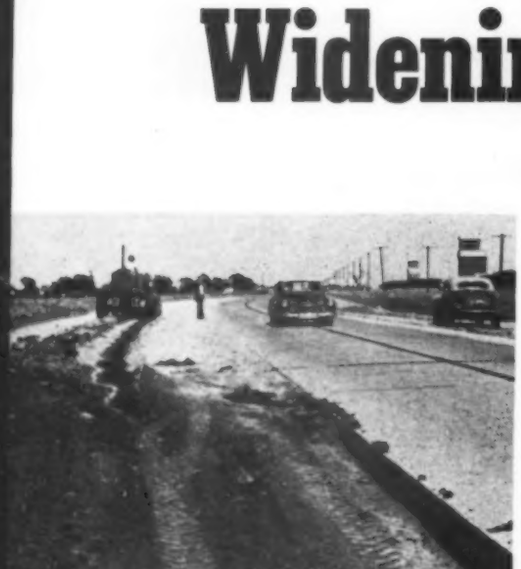
Tune in James Melton on "Harvest of Stars!" NBC Sundays!

THIS EMBLEM IDENTIFIES GREAT TRUCKS
INTERNATIONAL

INTERNATIONAL Trucks

How Austin Road Company placed 6,000 to 8,500 ft. daily of 3-ft. concrete strip with small crew, simple equipment —61 miles of strip placed under traffic without single traffic accident

Widening 1¼ Mile a Day



Location: U. S. 66, east of Amarillo, Texas, in Patter and Carson counties.

Project: Widen existing 9" x 18' concrete with 3-ft. concrete strips on either side, 21.6 miles.

Contracts: Two adjoining sections, 16.4 and 15.8 miles, both to Austin Road Co. of Dallas. Completed summer '47.

Streamlined Set-up

Paver made 8220 ft. of strip in 10 hours, day accompanying photos taken.

Trenching. Done in the dry sandy clay material by successive motor grader passes, using standard blade. Shoulder cut down to subgrade level

★ The grader first took the inner shoulder down to required depth. No rolling

★ Contractor-built fine grader, towed by Allis-Chalmers tractor straddling the forms. Wheelbarrow handles used to lift hinged cutting blade at intervals, leaving mounds of accumulated material which are shoveled out by hand—two men on complete operation, doubling at form setting and pulling

★ A standard mechanical finisher was rebuilt for widening work. Note water truck feeding storage trailer

★ 1-in. wood expansion joint, placed every 57 ft. to match position of joints in existing pavement

★ Three flags back of warning frame, which also indicated point at which workers can slip on slab; one flag on old slab immediately back of paver. This job was well protected.

and material thrown toward ditch for use later in redressing and widening shoulders with blade. No rolling. Trench fine graded after forms set, by dragging a special cutting blade, see photos.

Aggregates were rail shipped, deliveries proving only serious job bottleneck.

Batch Plant—two set-ups, midpoint on each contract. Heltzel bins, Blaw Knox cement plant, Northwest crane with 1½-yd. Owens clambucket.

Batch Delivery in 2-batch Ford and Chevrolet trucks, using as many as fourteen.

Paver, 34-E single-drum Foote.

Forms—7,500 lin. ft. used. Pulled every afternoon, taken ahead and reset late, p.m. and early a.m. for day's run.

Spreading of concrete aided by a special spreader box (not pictured). Box, designed by contractor, had double flange wheels for riding forms and flat wheels on right side for riding pavement. Bucket connected to paver and towed by it, and so spaced that power bucket could dump into it. Bucket flanged at top to take discharge from paver, and equipped with adjustable sliding gate strike-off.

★ One side has been widened. Flagman waving motorist through—U.S. 66 in the Texas panhandle was a busy road last summer

★ Finish manipulation was practically eliminated. A few swipes of the long handled float, use of edger, a bit of hand troweling at joints, burlap drag

★ Curing spray operator used a dolly to bring up barrels of compound

Finishing with a Lakewood unit rebuilt for widening work. Long handled 3-ft. floats (two), burlap drag, long handled edger, steel trowel at joints.

Curing — membrane materials, sprayed by hand from gasoline motor outfit towed along on a cart. Note separate dolly for bringing up drum.

Slab design—doweled expansion joints spaced 57 ft. 4.15 bag "strength" design. Three slip dowels per joint, 1-in. wood joint—see photo for assembly. Widening slab on first project, 10 in. thick adjacent to old slab, thinning to 9 in. at outer edge. On second project, undercut design involved 8-in. slab beveled to 12 in. to afford an under sill 4 in. thick and 6 in. back under old slab.

Traffic flags and warning signs. Three red painted tin "flags" mounted on wood frames, were set on the newly laid strips at intervals back of the work. Striped frame of high visibility set along new outer edge 200 to 500 ft. back of paver and moved several times daily. Fourth flag placed at edge old slab alongside freshly finished strip. Flagman at paver acted when necessary during truck maneuvering.

Safety Record—Quoting Tyree Bell, president of Austin Road Company, "to the particular credit of the supervising crew, was the accident prevention record accomplished. Facing the heaviest continuous interstate traffic of any highway in Texas, the men completed both projects without one single accident to the traveling public. This organization is quite proud of the accomplishment on the project in preventing accidents and in the production achieved."

Organization. Average payroll, 70 men. J. E. Harris, resident engineer for Texas highway department, Amarillo district, J. G. Lott, district engineer. J. W. Jackson, inspector. T. J. Insall was superintendent and D. B. Lattimore foreman.

How Far Will a Motorist Park from His Destination?

Conclusions on this and other basic questions in traffic regulation given in following summary from Virginia Department of Highways.

Traffic and planning engineers of the Virginia Department of Highways are learning a lot of group psychology as they wrestle with urban traffic congestion.

Surveys in several cities have revealed several definite motorist behavior patterns which must be reckoned with. An extension of off-street parking facilities is an obvious need, but phychological factors enter even the solution, notes a department bulletin.

Parking Must Be Near

One point proved almost beyond question that in smaller cities the motorist is unwilling to walk more than two blocks from his parking place to the downtown stores. Rather than hike more than two blocks, he will monotonously circle downtown blocks, looking for parking space.

Which means that parking lots—even free parking lots—will represent just so much wasted space and money unless they are in the heart of the downtown section.

As cities increase in size, the motorist is willing to walk farther. But even in the larger Virginia cities, it was found, the average shopper will park no more than four blocks from his destination. Instead, he will add to the existing congestion by cruising in search of an elusive parking space.

Where a fee is charged for the use of parking lots, the amount the shopper is willing to pay will vary with the distance from parking lot to shopping center. Outside the four-block limit in larger cities, the shopper is usually unwilling to pay anything; he may pay a relatively high fee for parking space immediately adjacent to his destination.

The length of time he intends to park will also influence his willingness to pay for space. If he is to park for only an hour, he balks at more than five cents. He usually considers 15 cents fair for three hours, 35 cents for all day.

One-Way Street Experience

Another oft-considered solution to downtown traffic ills is the establishment of one-way streets. Surveys and experience have shown definite reactions to this method.

Downtown merchants, in general, oppose one-way streets on the grounds that they are harmful to business. This is frequently the case immediately after the one-way streets are set up. Business may fall off as much as 30% during the first week, but after a month or two it will level off and may even increase.

The reason seems to be that the motorist is simply confused by the change and doesn't know how to reach the store at which he habitually trades. As he learns his way around, however, he often finds that one-way streets make it easier for him to reach his destination. He may even come downtown more often for shopping.

"No parking" zones seem to meet the general disfavor of shopper and merchant alike, even on the more narrow streets. Sometimes they offer the only solution to the congestion problem, but traffic engineers have found one-way streets to be a better answer when at all possible.

Many streets cannot carry two-way traffic when parking is permitted on both sides. They can, however, carry one-way traffic. Problems arise even here—for many automobilists simply cannot master left-handed parking.

Fringe Parking N.G.

"Fringe parking" is a suggested solution which so far has not worked in Virginia. Parking lots are provided well out of the downtown district and public transit facilities are made available, on frequent schedule, to transport the shopper to the stores. Virginia drivers don't take to this method. They apparently feel that if they have to use mass transportation, they might as well ride the street car or bus for the whole trip.

"Stop-Go" Confusion

Traffic signals—the familiar "stop-and-go" light—often run afoul of motorist psychology and cause more harm than good, studies have led

(*Continued on page* 120)

"QUICK-WAY" TRUCK SHOVELS

Far and away . . . THE BEST BUY Today!

Big Shovel Quality Small Shovel Price

- **SEVEN USES** on one chassis: convertible *in minutes* from shovel to clamshell, dragline, trench-hoe, scoop, crane or pile driver.
- **TO THE JOB QUICKER:** Truck speed on or off the road . . . no trailer to wait for or pay for . . . more hours on the job.
- **FAST HOIST** and swing action that gets more work done per man hour.
- **LOW MAINTENANCE:** Many parts interchangeable, easy to adjust, easy to repair, easy to convert.
- **LOW FIRST COST:** In spite of rising material and labor costs "QUICK-WAY" prices are only 10% above 1941.

Regardless of what *larger* equipment you have, you need "QUICK-WAYS" too. There's a "QUICK-WAY" owner near you: ask HIM.

Model E: 4/10 cu. yd. cap. for mounting on any standard 5-ton truck.

Model J: 1/4 cu. yd. cap. for mounting on any standard 1½-ton truck.

Service available from Distributors strategically located in U.S. and worldwide

For speed, portability, economy of operation, and adaptability to a wider range of jobs, nothing of comparable size equals a "Quick-Way" Truck Shovel.

"QUICK-WAY" TRUCK SHOVEL CO.

DENVER, COLORADO

First to build power shovels for truck mounting; still the leader after 28 years

Cage for Chloride Sacks

A home-made cage for receiving empty sacks while spreading calcium chloride is pictured here. It consists of a wire and metal frame mounted on a standard spreader. Made of scrap metal by employes of the Berry County (Mich.) highway department, it is reported to have eliminated the need for an extra man to stack empty sacks which would otherwise blow off the truck. It is also a safety aid, since the man eliminated is normally perched on top of the bags where it is easy to fall off. The frame and weight of sacks also act as a counter-balance for ease in handling the spreader.

Trailer-Mounted Mixers

Truck mixers or agitator units are customarily mounted on their own heavy-duty, short-wheel-base trucks, which have been evolved into highly efficient units for ready-mix deliveries through city streets and over considerable outlying hauls. A variation in ready-mix delivery has been devised by a southern contractor, who has mounted two mixer units on trailers. This arrangement has proved excellent for special long, fast hauls, and has enabled the contractor, Duval Engineering & Contracting Co., of Jacksonville, Fla., to cash in on the advantages of central-mix or transit-mix without tying up its own trucks in areas not conveniently served by commercial ready-mix firms.

●

Value of Toll Facilities to Motorist

The American motorist values his time at from 0.7 ct. to more than 1.25 cts. per minute for the privilege of using toll bridges and highways which can save him time.

This is one of the conclusions reached in a report issued by the Yale Bureau of Highway Traffic on "Toll Bridge Influence on Highway Traffic Operation." It was written by M. Earl Campbell, formerly state planning engineer of the West Virginia State Road Commission and now with the Highway Research Board in Washington, D. C.

Campbell used highway bridges in West Virginia, as laboratory "test tubes" for reaching his conclusions about the influence of toll stations on highway usage.

Some of his findings are:

When tolls are removed from bridges which previously made charges, as much as 53% additional traffic finds use for the bridges—in other words, the free bridges accommodate 153% of the toll bridge traffic.

Motorists place a high cash value on their time. Using a mathematical formula for evaluating the time saved by highway users of toll facilities, provided the origin and destination of traffic are known, he found that in West Virginia motorists value their time from seven-tenths of a cent to slightly more than one cent per minute. On the other hand, when the Boston Post Road and Merritt Parkway are compared on the basis of the same formula, the motorist traveling between New York and New Haven values his time up to 1.28 ct. per minute.

One Way to Begin Finegrading

When the W. L. Johnson Construction Co. began putting down 21-in. concrete for the B-36 runway at Patterson Field this past summer (See Aug. '47 R. and S. for extensive story), they had the usual problem of finegrading. Grading had been completed some months before, and heavy hauling had roughed the surface up quite a bit.

Finegrading was given the finishing touches after forms were placed, but as a preliminary, using the equipment on hand, this contractor speeded up the re-shaping job by putting an extra-long (26½-ft) blade on a motorgrader and giving it a husky towing unit. See photo for this outfit at work in dry, compacted gravelly material. The same blade was also used at times in between the forms, the blade just fitting the 25-ft. lane width when on a slight diagonal. Roller attachments on either end of the blade are for riding forms and adjacent slab.

Chuck Mounted Drills Speed Hole Drilling for Mudjacking

In connection with mudjacking work on U. S. 77, Victoria County, Texas, the drilling of holes was speeded up by mounting two drills in chucks on the back of a compressor chassis. Speed was 100 holes an hour. Some outfits like this included a third manually operated driller. Drills were said to have lasted only five holes each on the average, after which they were discarded, not sharpened. Drills cost 23 cents each.

•

Illinois—Lt. Governor Hugh Cross is chairman of a commission charged with recommending a 1948 road program to the legislature. New gas tax or other financing is in the wind, and so is a tussle over the proposal to abolish the state's 1565 township road commissions.

Tree Spraying Outfit

City street and park departments will be interested in this tree spraying truck, assembled by the street department of Birmingham, Ala., L. D. Merrill, supt., and J. W. Morgan, d. of p.w. The equipment embodies no novelty, consisting simply of a pressure tank, small gasoline powered pressure pump, and spraying hose and nozzle. The novelty lies more in the fact that a city's street personnel found it desirable to put such a truck into service, which was done initially in this instance to combat a beetle epidemic and has been used in spot locations since.

Sealing and Dust Laying

Chief street activities in Birmingham, Ala., during past year

DOWN in Birmingham, Alabama, which is the home town of Jim Morgan, new president of the American Public Works Association, the city street department has quite a job on its hands maintaining some 635 miles of street. Little new paving is going on just now. The principal concern since the war has been to protect the extensive accumulated investment in street paving, which consists largely of concrete base (more lately, slag base) and asphalt topping.

During the war years, while Birmingham boomed and roared with steel production and heavy industries, little maintenance was performed. During 1946 and 1947, however, over 70 miles of streets were given systematic sealing. Briefly described, the seal consisted of from .2 to .3 gal. per sq. yd. of hot (375 deg. F.) No. 85/100 penetration asphalt followed with 10 to 12 lb. per sq. yd. of slag chips. Asphalt was applied with the city's 900-gal. pressure distributor, which loaded from the asphalt contractor's plant. The old surface, of course, was previously patched, low places brought up, etc., and broomed. Chips were tail-gated from trucks and rolled by a 6-ton 3-wheel steel roller with drag broom. Excess chips were cleaned off with a rotary power broom.

The complete seal in 1947 was estimated to cost 10 cents per sq. yd., including asphalt supplied hot f.o.b. distributor at 12¼ cents per gallon, this figure being the low bid on a 150,000-gal. contract.

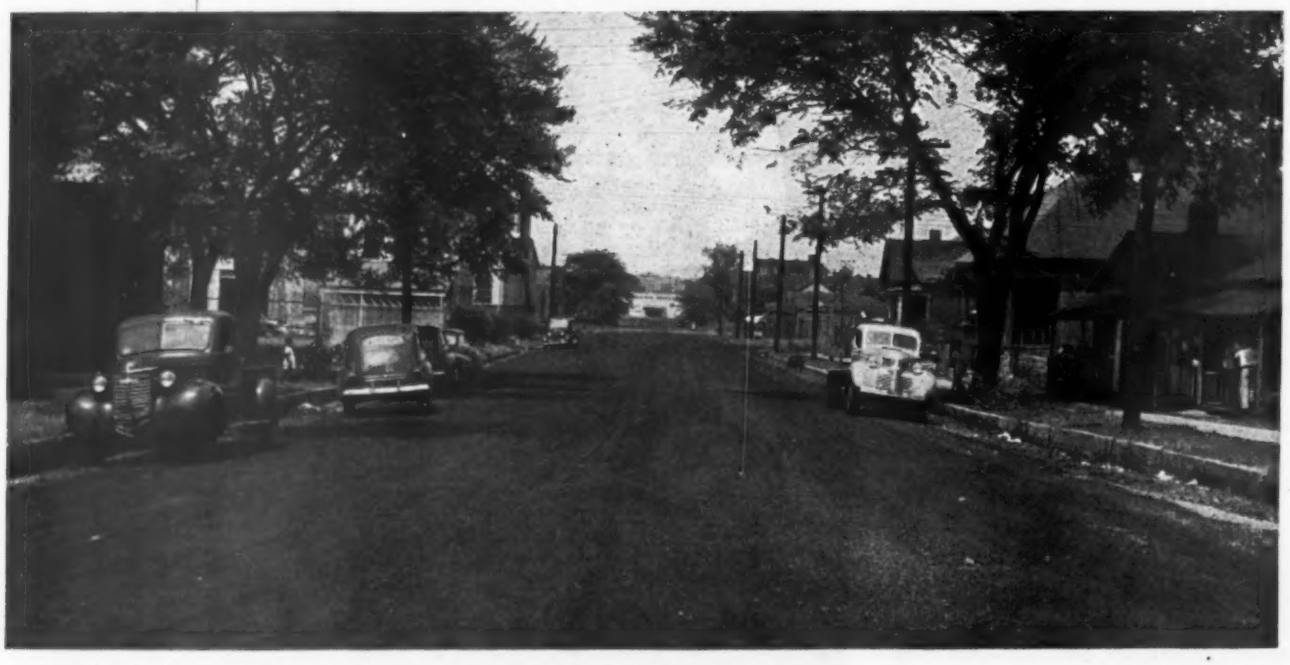
★ Slag chips being applied at rate of 10 to 12 lb. per sq. yd.

Dust Palliative

One of the largest dust-preventative programs of any city is another feature of Birmingham's 1947 program. A large mileage of unpaved suburban streets exists in the community, and the practice has been for property owners to get together in small groups and petition to have their streets oiled. Some 357 street parcels, ranging from one to four blocks each, were oiled during the past year.

One reason for the popularity of

(*Continued on page 97*)



★ A completed section of re-sealed street, put down this year under Birmingham's extensive program

Checked under the heaviest traffic loads . . . for over 20 years

THEY'VE SEEN the volume of traffic on some roads multiplied almost overnight. But Midwest contractors and public officials know this is no threat to roads built with Ohio Oil Asphalts. For these asphalts have proved, in more than 20 years of use, that they hold up under increased loads, year after year, with minimum repairs.

The Ohio Oil Company manufactures a complete line of all grades of rapid, medium and slow-curing asphalts and asphalt cements.

MARATHON

The Ohio Oil Company • Asphalt Department

ROBINSON, ILLINOIS • LOVELL, WYOMING • *Producers of Petroleum since 1887*

60 YEARS OF PROGRESS 1887-1947

Tacoma Narrows Bridge

Reconstruction to follow design resulting from extensive wind tunnel research

WITH the authorization of a call for bids on $14,000,000 worth of bonds, the Washington State Toll Bridge Authority moved a step closer towards the actual construction of the new and second Tacoma Narrows Bridge to replace the $6,400,000 structure that collapsed in a 40-mile gale November 7, 1940, just 4 months after completion.

Low bid for construction of the new span was $11,196,584.19, a combined bid of Bethlehem Steel Company for the superstructure, and John A. Roebling & Sons Company for wire cable and fittings. Engineers estimate that $14,000,000 is the approximate amount necessary to pay costs of construction, engineering and contingencies, costs of the bond issue, insurance and interest during construction and for 6 months thereafter.

The mile-long span will form a short cut across a narrow arm of Puget Sound connecting the Seattle-Tacoma area with the rich hinterland of the Olympic Peninsular. At present, traffic must use ferry service across the Narrows or drive an extra 30 to 40 miles around the upper reaches of Puget Sound.

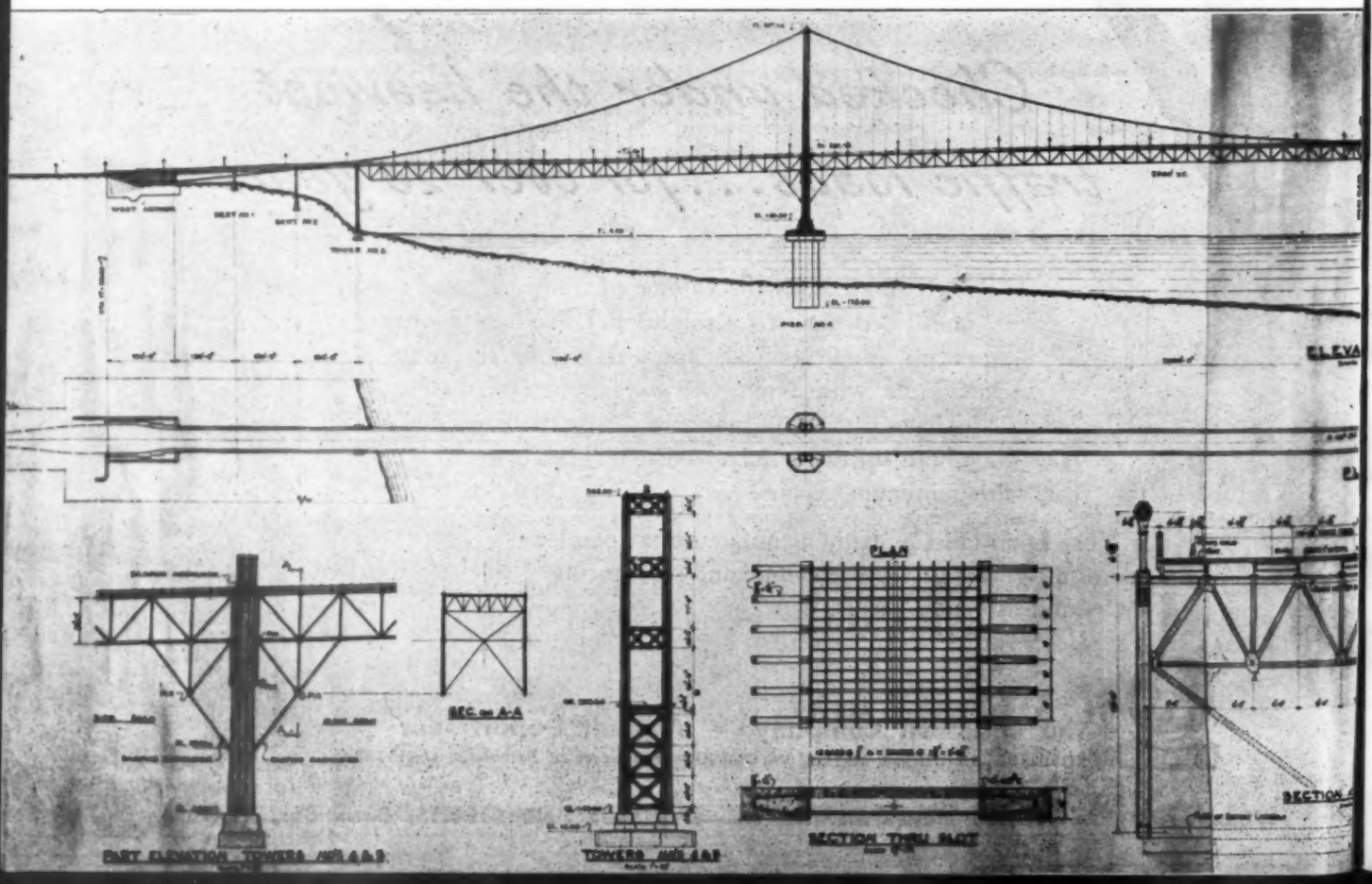
New Bids Higher

As low bid on the bridge is 34% higher than the original estimate, actual acceptance or rejection of bids must wait until Dec. 15, at which time a decision will be announced. Costs of construction have risen so rapidly that engineers were unable to approximate the latest figures. Bids on the bond issue were to have been opened Dec. 2. Sentiment in the area is overwhelmingly in favor of immediate construction in spite of the inflated bids, so it is highly probable that the bids will be accepted. Insurance covering the new bridge has already been completed and spread over a great number of companies, but readjustments will now have to be made in keeping with the high bids.

It will be remembered that when the first bridge collapsed, there were countless controversies among engineers as to the causes for one of the most disastrous bridge failures in history, and one that proved so costly to all insurance companies involved in its coverage.

During the past 7 years, engineers accepted the challenge handed to them in designing suspension bridges that would stand up under any weather conditions. In 1942 a large wind tunnel was constructed at the University of Washington, Seattle, at a cost of $100,000. As a result of years of experiments conducted with 30 different types of suspension bridges in the wind tunnel, builders of the new Tacoma Narrows Bridge will be handed the most thoroughly tested design in the history of suspension bridge construction.

The Toll Bridge Authority took no blame for failure of the first bridge. That structure was designed by New



York engineers who had little or no knowledge of the turbulent wind conditions prevailing in the Narrows. Through long and arduous experiments conducted at the University, engineers have determined according to their report, that, "A full knowledge of the natural wind, such as maximum velocity, direction, both horizontal and vertical; the effect of terrain on angle of attack; probable duration of periods of nearly constant velocity, etc., all have a bearing on design and model tests. The sufficiency and safety of existing bridges cannot be judged unless considerable knowledge of the actual storms to which they have been exposed is at hand."

Clarence B. Shain is Director of Highways and Chief Engineer of the Washington Toll Bridge Authority. Under Mr. Shain's direction is a Board of Consulting Engineers consisting of Chas. E. Andrew of Tacoma, Chairman of the Board and Principal Engineer in direct charge of design and construction; Glenn B. Woodruff of San Francisco, and John I. Parcel of St. Louis, members; and Dr. Theo. von Karman, Consulting Aerodynamicist. Dexter R. Smith is Designing Engineer.

Professor F. B. Farquharson assisted the department in measuring and recording movements in the former bridge and has had immediate charge of wind tunnel design and construction, and model testing for the state at the University of Washington. Valuable aid and financial participation in model tests have been given by the Public Roads Administration under Thos. H. MacDonald, Commissioner.

During the short 4 months of its hectic life, the ill-fated bridge rightly earned for itself the nickname, "Galloping Gertie," because of its tendency to dance and undulate with every passing wind. Engineers made desperate efforts to stabilize the structure by constructing huge concrete anchors under the bridge approaches and attaching them by heavy cables to the bouncing deck. But all to no avail.

In 1942 they constructed a scale model of the first bridge in the University wind tunnel and subjected it to a 40-mile-an-hour wind blast. The results were amazing, in that the model bridge danced and twisted in exactly the same manner as had the doomed structure.

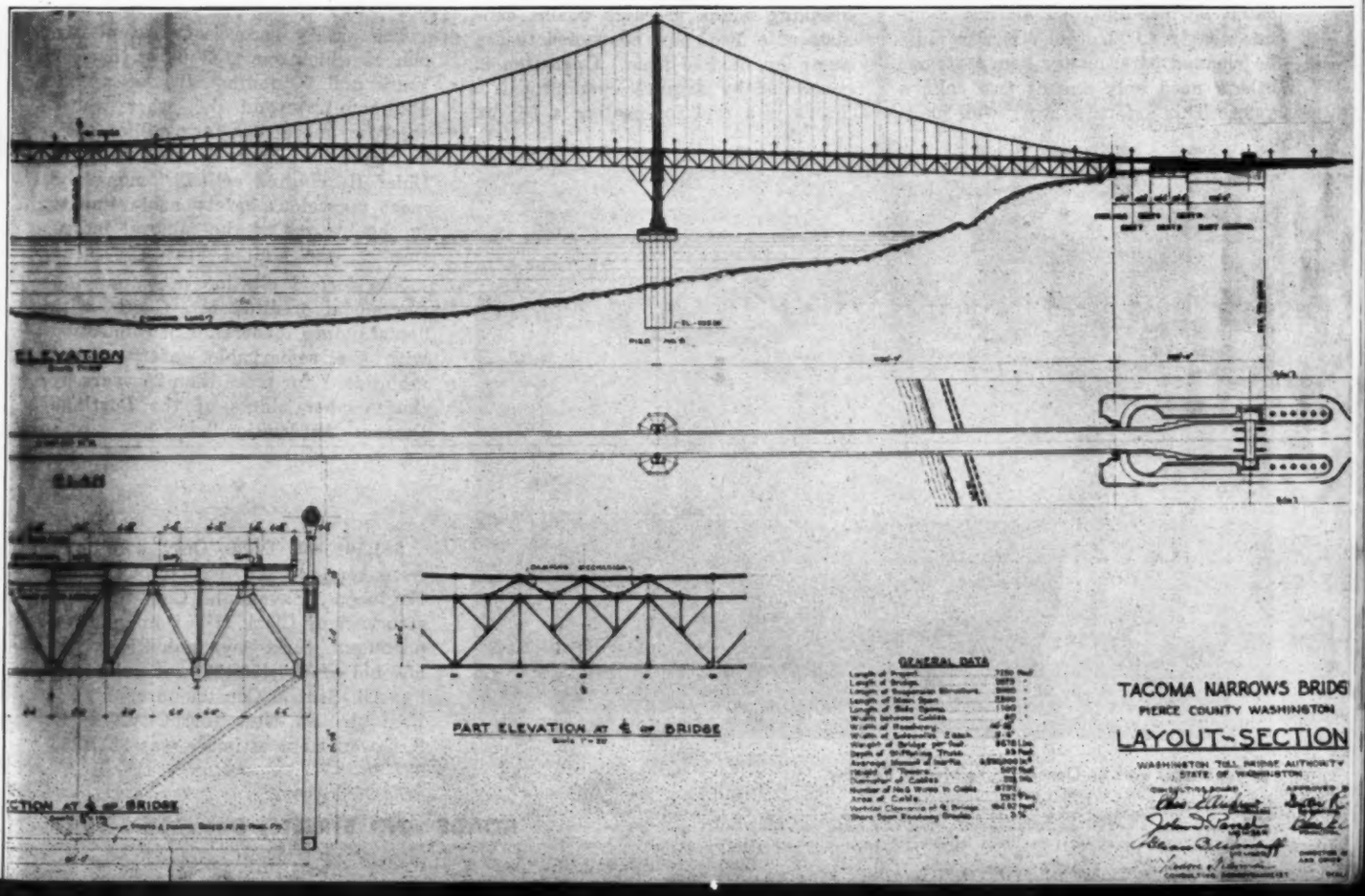
In 1946 engineers on the project issued a report that failure of the bridge was due to its lightness and built-up wind pressures against the structure induced by the closed sides and solid paved deck. The new bridge will be twice as heavy, with 4 traffic lanes instead of two, a 2,800-ft. central span and end spans of 1,100 ft. The two supporting towers will be 40 ft. higher than the original 500-ft. towers.

Preliminary plans call for utiliza-

(*Continued on page* 90)

Dimension Comparisons of the Old and New Tacoma Narrows Bridge

	New Bridge	*Old Bridge*
Deck width between curbs	46'-4" & two 3'-9" sidewalks	26' & two 5' sidewalks
Width of towers, or between cables	60 ft.	39 ft.
Structural weight	31,000,000 lb.	18,400,000 lb.
Height of towers above low water	507 ft.	448 ft.
Length of span, including approaches	5,979 ft.	5,979 ft.
Approximate weight of cables	10,880,000 lb.	8,000,000 lb.
Size and make-up of cables	19 strands of 458 No. 6 wires each	19 strands of 332 No. 6 wires each



How Connecticut Cleans Highway Catch Basins

SIX truck-mounted suction pumps for cleaning catch basins are an important part of the Connecticut state highway maintenance equipment. Furnished one pump to each of the six maintenance departments beginning in 1941, these pumps are of special use in this state because of the large mileage of roads that have urban type catch basins.

The original purchase was for cleaning basins on the Merritt Parkway. Maintenance workers had found it almost impossible to do a satisfactory job by hand on deep basins, and wartime labor shortage speeded the mechanization of the work.

The suction pumps on Merritt Parkway can be used on both left and right-hand sides of the lanes without turning the trucks around, which is an important detail in the interest of safety. Safety of operation in the method of traffic flow is also bettered by the general speeding up of the operation compared to manual cleaning.

Connecticut's 3,000 miles of state roads have from 15,000 to 20,000 catch basins, and one district alone has nearly 4,000. Many basins must be cleaned after every heavy storm; others need only one or two calls a year. This extensive work well justifies the cost of the pump-equipped trucks, which has a range from $6,000 in 1941 to $7,000, for later purchases.

With the large program since 1939 of subsurface drainage installations, additional surface drainage installations, and combined system installations, the cleaning of catch basins and manholes has been more of a problem than ever. The increase in dual highway installations has made it important, due to the heavy fast traffic, to get our basins cleaned out as quickly as possible and get through.

The units of a commercially manufactured standard pumping unit (Elgin) are of a 3-in., single stage, heavy duty high-pressure, centrifugal type. The power unit is 75 hp. six cylinder heavy duty. The water tank has a capacity of 1,240 gal. There is a special ejector chamber and jet for creating high efficiency suction fitted with renewable jet nozzle. A 3-in. heavy duty flexible hose connects the centrifugal pump to the eductor nozzle assembly. The water jet agitator for adding water and breaking solids in catch basins consists of a 1-in. pipe connected to the pump by flexible hose. Operation is controlled by a quick opening valve. There is a reel for cooling a 3½-in. diameter by 25-ft. long armored sand suction hose with nozzzle assembly fitted at the lower end of the hose. The upper end of the suction hose is connected to a hollow-center pipe of hose reel for discharging contents into the tank body.

In the Hartford Metropolitan area, arrangements have been made for hooking direct onto hydrants for water supply. In the rural areas water supply is obtained from streams.

The sediment tank is pumped out about once or twice a day. All that is necessary is to back eductor into the location where the material is to be deposited and pump out the sediment. This takes but a short time.

★ Eductor at work on Connecticut's Merritt Parkway

Safety Award for Cement Industry Record

The Joseph A. Holmes medal of honor was awarded Nov. 12 to A. J. R. Curtis, Safety Director of the Portland Cement Association for his contributions to safety in the cement industry. The medal was presented by Dan Harrington, Secretary of the Joseph A. Holmes Association and Chief of the Health and Safety Branch of the U. S. Bureau of Mines. The occasion was the closing session of the PCA's 46th annual meeting held at Chicago. Mr. Curtis is only the second individual to receive this metal.

The safety record of two plants, one of which operated more than 12 years and 9 months without a disabling injury and the other whose record of more than four million accident-free man-hours is unterminated, Chief Harrington called, "among the most marvelous safety achievements in the history of the mineral industries in the United States."

The formal citation accompanying the medal credited Mr. Curtis with "outstanding leadership in connection with the remarkable safety record maintained for more than 25 years by the member plants of the Portland Cement Association."

•

$21,500,000 Dam—Only two bids were received Nov. 21 by Corps of Engineers, Savannah, Ga., for construction of Clark Hill Dam and appurtenant work, Savannah River. The low bid of $26,456,197 was submitted by All States Constructors, Inc., 1 East 43rd St., New York City. The U. S. Government estimate was $21,485,837.

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WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division, Holyoke, Mass.

1 First cut — reform inside ditch slope and roll turf to shoulder. Note ideal soil condition, neither too wet nor too dry

2 Second cut — plane shoulder down to pavement height, with Allis-Chalmers grader rolling waste material into windrow on pavement edge. Backslope left as is through this work section

HIGH SHOULDERS

How Kentucky trims 'em with fast blade and loader outfit

HOW to deal with grassed shoulders that have developed a heavy turf and heaved over a period of years until they drain toward the pavement instead of away from it, is a perennial maintenance problem. The treatment of high shoulders, of course, depends on soil and climatic conditions. If the soil is not too easily eroded, and if new covering can be quickly developed, it is sometimes feasible to reshape the shoulder and ditch. The accompanying photos show how a maintenance crew of the Kentucky state highway department performed a decisive and neat job at the rate of five thousand feet or more of shoulder per day. An extensive mileage of U. S. 42 between Louisville and Cincinnati was covered during October.

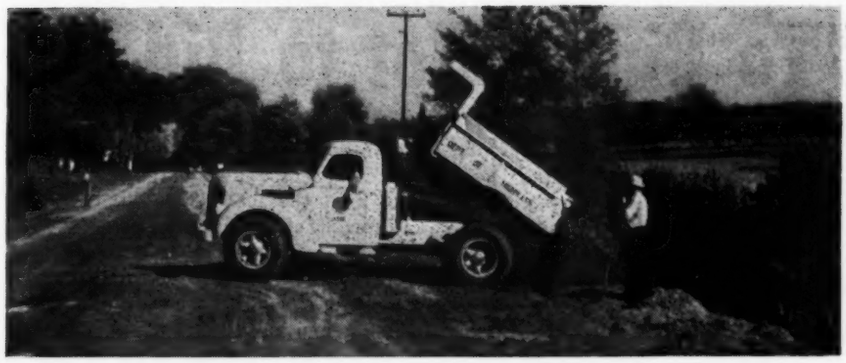
The outfit used consists of a heavy motor grader, a power loader, three dump trucks (one 1½-yd. and two 2½-yd.), and hand tools including a post hole auger and several shovels. Ten men made up the crew—five operators or drivers, two flagmen, two laborers and a foreman.

The procedure was simplicity itself. The grader made an initial cut along, say, a 1,500 or 2,000-ft. ditch section, shaping the inner ditch slope in one pass and leaving a roll of turf on the shoulder. The operator then backed up and made a second pass with blade level in which he planed the shoulder down to pavement height and rolled the turf and earth material into a windrow on the pavement.

Next came the loader which fed the windrowed material into trucks. The material was dumped over the edge of the nearest fill slope for the double purpose of disposal and of widening

3 An Athey force feed traveling loader eats up windrowed material, loading it into dump trucks

4 Trucks (this a 2½-t. International) dispose of material over embankment slopes, thus adding to shoulder width, an improvement much needed along the busy Louisville-Cincinnati road (U. S. 42)



5 Mail box and traffic sign posts are removed and reset by hand. Hand shovel work is also needed around culvert headwalls

the shoulder. That's all. With modern power equipment, the crew progressed so rapidly that the flagmen were constantly picking up the "Slow" and "Men Working" sign tripods and moving them to new locations immediately beyond each new section cleaned up.

Mail box and traffic sign posts located in the shoulders were taken up by hand in advance of the grader and reset. And of course some hand trimming was needed around culvert headwalls, at farm entrances, etc.

In commenting on this work, foreman Robert Hartman of state highway district 4, who had charge here, observed that in the old days twenty or more men with lighter equipment would have had difficulty making half the daily progress.

Federal-Aid Airport Program Makes Progress

Up to November 5, according to W. R. Macatee, manager ARBA's airport division the Civil Aeronautics Administration's Washington office had received 117 Project Applications for airport development, and at that time 104 Grant Offers had been made, involving $11,674,836 of federal-aid funds. This represents about 18% of federal-aid funds so far appropriated for airport development under the Federal Airport Act. The figures do not take into account projects which may be in preparation for Project Applications at CAA regional and district levels.

CAA officials in Washington have expressed the belief that 40% of available funds will be under Grant Offers by Dec. 31, the balance obligated by spring 1948.

The time required for putting the program under way may at first appear to be unduly slow. Comparative analysis, however, bears out the fact that considerable time is invariably required to initiate such programs, and that the Airport Act has gotten off to a start comparing favorably with other federal grants-in-aid programs.

Eleven Western States Subject of ARBA Study in Expansion Program

Looking toward the possible opening of the American Road Builders' Western Association, with headquarters in San Francisco, the American Road Builders' Association has retained Floyd O. Booe, of San Francisco, well known in the highway construction field, to conduct a two-months' survey of eleven western states. Mr. Booe's report will be presented at the ARBA Highway Conference to be held in Washington, January 26-28, 1948.

Mr. Booe's equipment for this job includes ten years as secretary of the Nevada Highway Commission and twenty years as manager of the Northern California Chapter, Associated General Contractors. He has a wide acquaintance among road builders and highway officials in California, Oregon, Washington, Arizona, New Mexico, Montana, Nevada, Wyoming, Colorado, Utah and Idaho, the states to be surveyed.

Traffic Lights Not Always Answer

Traffic lights are not necessarily the answer to traffic problems at intersections, Highway Commissioner Charles M. Ziegler said today in reply to a growing multitude of requests for lights which have been coming in from all parts of the state, in such volume that the State Highway Department could not begin to obtain enough lights to meet all the demands.

Scientific studies by traffic experts throughout the nation have shown that in many cases accidents have increased rather than decreased at intersections after the installation of traffic signals. One study by the National Safety Council at 354 intersections in 22 cities, including Detroit, revealed an increase in accidents at 135 of these crossings. These increases ranged as high as 79%. Head-on and rear-end crashes and collisions involving vehicles making turns were prominent in these increases.

Commissioner Ziegler explained that every request for installation of a signal results in a thorough investigation of the area concerned and if it is shown there is a definite need for a signal and that it will improve conditions a signal will be installed. On the other hand, if it is shown that a signal may tend to congest traffic and encourage accidents, or that traffic volume is light and does not meet the standard warrants established for the installation of a signal, then requests are not approved.

•

$55,000,000 improvements for Newark Airport—The Port of New York Authority which recently leased the Newark, N. J., airport will expend $55,000,000 for improvements including acquisition of 800 acres of additional land and runway extensions.

"To Bid or Not to Bid"

Published originally in "Nerba," organ of the New England Road Builders' Assn., and reprinted here with permission, these remarks represent the thoughts of the author and not necessarily the policy of the Connecticut state highway department.

By E. T. Nettleton
Engineer of Contracts
State Department of Highways of Connecticut, Hartford

IN order to make an intelligent bid for highway construction the average contractor will spend from one hundred to a thousand dollars depending on the type and size of the job. This amount includes both direct and indirect costs incurred in looking over the site of the work, the hauling conditions, and unloading facilities; in obtaining material costs and sub-contract quotations; in calculating the estimated job costs; and in compiling his bid. Before going into all the details and spending valuable time and money, it might be well for the contractor to make a few preliminary checks in order to ascertain in advance whether the job is actually what he wants and, if so, whether or not his chances of obtaining the contract are reasonably good.

First, and foremost in importance to the contractor is the type of construction contemplated. The job should be of a nature in which the contractor's supervisory personnel and key men are experienced. In addition, the contractor should have available, or be in a position to acquire readily the most modern equipment necessary for the project at the time the equipment is needed.

Second, and just as important to the contractor, is the size of the job as this pertains to his ability to finance it. The contractor should have enough net liquid or net quick assets available through his own financing or through his regular banking channels, to meet properly all the monetary demands of the job. These demands will consist of current job payrolls, payment of sub-contractors, prompt payment for materials in order to obtain advantage of discounts, freight and express charges, and various current contingencies. Among these factors are the retained percentages withheld because of contract requirements or winter shut down.

Third, and extremely important to the contractor, especially to-day is the labor situation. The contractor should be assured in his own mind that he either has, or can obtain, sufficient skilled, semi-skilled, and common labor to man the job adequately. He must know whether this labor is to be obtained locally, whether or not he will be required to furnish transportation, or whether he will have to set up a camp and import labor. Besides this he should be conversant with changing labor restrictions; such as, employment of minors, and non-citizens, and conditions of preferance for local citizens. In addition, he must know the minimum rates called for in the job specifications, the prevailing rates currently being paid, and any government limitations on maximum wages allowed to be paid. The contractor should also be familiar with the limitations of hours of employment and overtime features. Furthermore, he should inform himself as to the requirements of union and non-union employment and the possibility of strikes or jurisdictional labor trouble.

Job Location

Fourth, and a significant factor to the contractor is the location of the job. The project especially in these times, should be located within the accustomed area in which the contractor is familiar with the business conditions. Naturally, the closer the site of the work is to his home or regional office the better. Too much travel and shipping expense and too little supervision from headquarters may ruin an otherwise attractive contract.

Fifth, and still important to the contractor is his knowledge of the owner. Has the client available the finances or appropriations to go through with the job? If so, is the client's past record favorable in the matter of meeting payments when due? There have been too many cases where private owners and, in a few instances, where public bodies have asked for bids in order to arrive at cost estimates. In so doing they save themselves either the direct charges in employing consulting cost-engineers or the indirect charges in doing their own figuring. In either case the charge is unfairly placed upon the contractor, no matter what the outcome is. In some cases the appropriations may never be requested; in other cases, the appropriations are requested but not approved. If appropriations are obtained, the plans are usually changed slightly and bids are readvertised. This places the former low bidder at disadvantage as he has already disclosed his prices.

Sixth, and of considerable concern to the contractor is the reputation of the engineer. Are the plans of the engineer complete? Are his specifications clear? Is his judgment fair and are his interpretations reasonable? In other words, is the engineer one who places chances and verifications of engineering data upon the shoulders of the contractor? Does the engineer clothe indefinite specifications with that time worn clause, "the quality, workmanship, or methods employed shall be only those acceptable to the engineer"? Are his decisions and interpretations of specifications so rigid that they surpass equitable and fair treatment? The writer, being an engineer, can remind one of that old saying, "The devil you don't know is probably worse than the devil you do know." Therefore, for better or for worse, if the engineer is a known factor to the contractor, the latter, at least, knows how to figure accordingly. Contractors in general should beware particularly of those jobs for which specifications and plans are drawn by one Agency and interpretation and field supervision is handled by another concern.

Seventh, in the factors to be considered by the contractor are the job hazards, both natural and man made. Natural hazards to be considered are soil drainage, freshets, underlying rock, quick sand, winter weather and other conditions. Man made hazards are traffic, adjoining structures, public utility lines, limitations on blasting, hindrances caused by other contractors working in the vicinity and similar causes which are too numerous to mention.

Eighth, and of more than usual importance to-day is the availability of material and the probable delivery dates of materials to be incorporated in, or used on the job. If delivery is delayed, is the contractor protected against increased material prices and labor prices? Does the delay push the job into winter weather?

After the consideration of these eight preliminary factors, the contractor is in a position to judge whether to bid or not to bid. If his answer is in the affirmative, then the contractor should spend all the time and expense that is necessary to make a thorough investigation of the site of the work, of the plans, of the specifications, of the special provisions, and a thorough analysis of estimated costs for the job. With this detail information and with computations on hand the contractor should be, if he has properly estimated the job, in a position to bid and to bid wisely on a job suitable for him to undertake.

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Easy to inspect — self-locking thread on the back head and snap-in key on packing retainer permits easy assembly, disassembly, and packing adjustment. Butt, firmly held by a straight splined taper on the piston rod, can be quickly removed.

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RD-14

★ Dual-drum placing lower lift seen in foreground; single-drum follows the placement of reinforcing. Note that pavement finishing is completed and bituminous curing application being made a short distance behind paver

Twin 34-E's

pave 2500-3300 L.F. daily on N.Y. project

Experimental use of four cements a feature of Bero Engineering and Construction Corp. project in Buffalo district

THE Olean-Hinsdale (N. Y.) highway project herein reviewed provides for construction of 4-lane concrete for 5.2 miles on Touring Route 16 in Cattaraugus County.

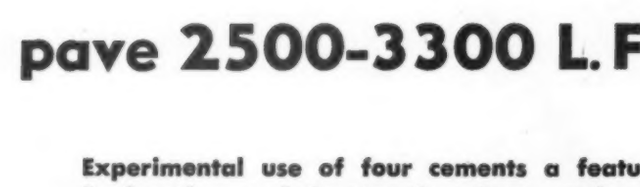
It begins about a mile north of Olean, extending an existing 4-lane pavement northward. The new pavement follows existing right-of-way, except for about 1½ miles in the hamlet of Hinsdale, where a new location is established to lessen property damage and to provide for higher design standards.

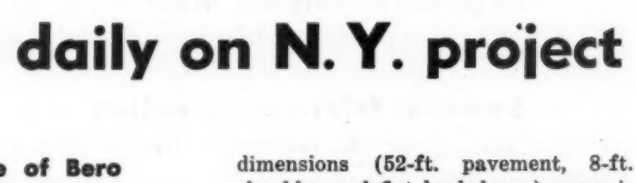
This project was one of the first large postwar state highway contracts in western New York. The design embodies all of the latest highway standards for main route highways: minimum sight distance, 1000 ft. (h. and v.); traffic lanes 12-ft.; 4-ft. center mall, concrete paved. Wide dimensions (52-ft. pavement, 8-ft. shoulder and flat backslopes) necessitated additional right-of-way throughout, acquired along one side where possible to minimize damage.

Quantities in the $1,199,000 contract include 38,175 cu. yd. concrete pavement, 311,800 cu. yd. unclassified excavation and other items noted in bid tabulation.

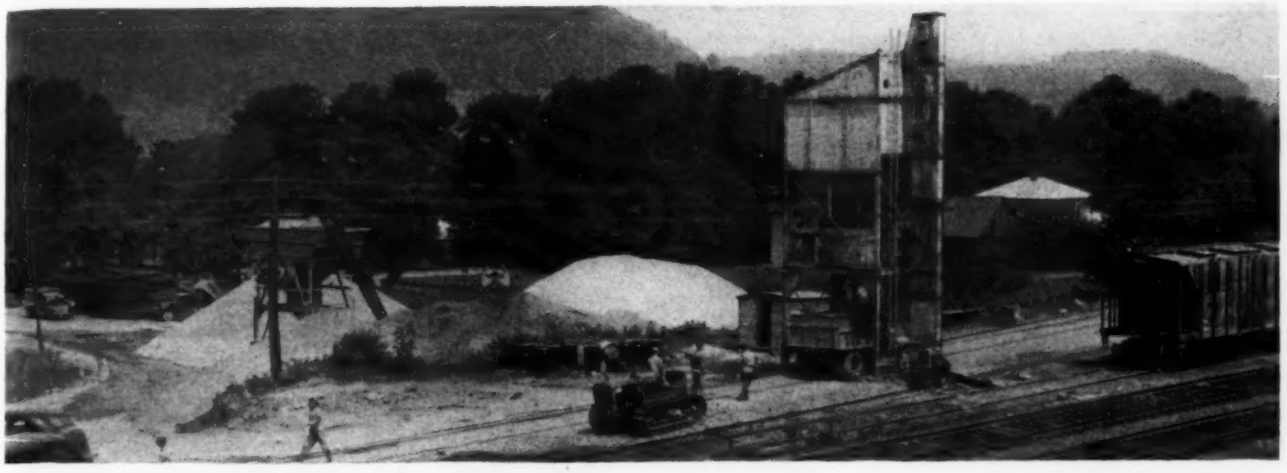
Cement Test Project

Four different cements are being incorporated on an experimental basis: ordinary Type II portland cement (which must meet state specifica-

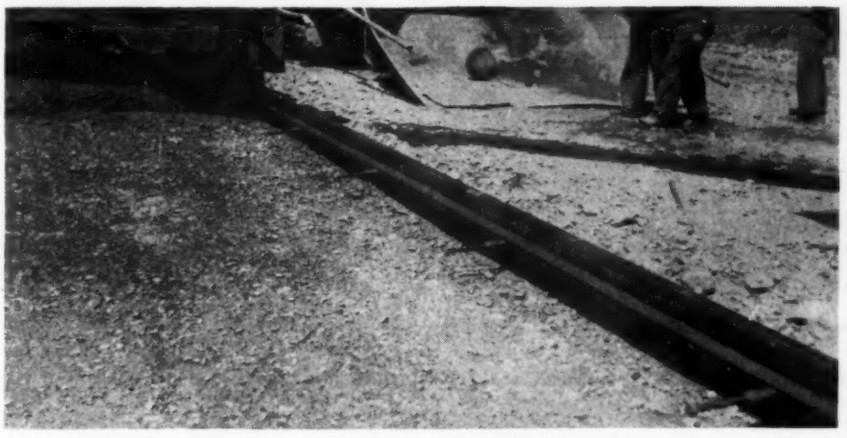




★ New modern alignment, compared with a stretch of the old road it will replace



★ This modern plant gets part of the credit for the good daily yardage



★ Longitudinal construction joints—tongue and groove design with ¾-in. tie bolts spaced 5 ft. cc.

tions) combined with natural cement; ordinary Type II cement combined with Daragg Puzzalan cement; ordinary Type II portland with nacconal air-entraining agent; and Vinsol Resin portland cement. Accurate records are being kept of the location of the various cements used—also the percentage of air-entrainment obtained in their use—and upon completion cores will be taken and strengths recorded.

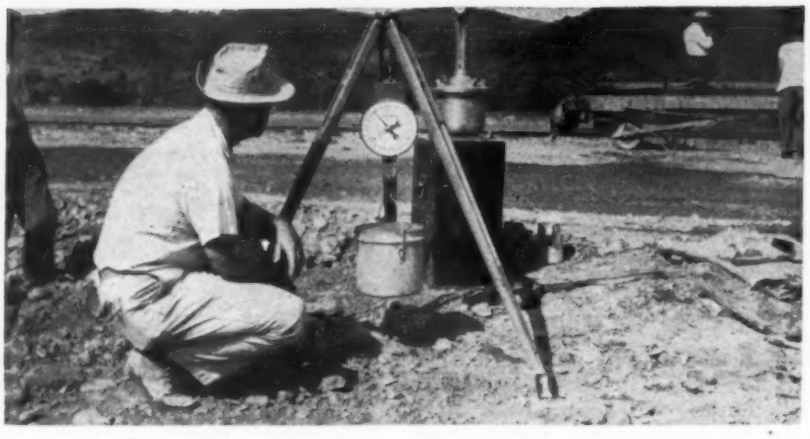
Contract was awarded to Bero Engineering and Construction Corporation, Buffalo, Sept. 5, 1946; bid price $1,215,988.85. Work was started Sept. 16, and except for about one midwinter month continued into late 1947. Completion by Jan. 1, 1948, is anticipated.

Concrete pavement operations were started July 9, 1947, and by mid-August about 50% of the paving work was completed. Two 34-E pavers were used in tandem; one dual and one single drum. The first paver placed concrete below the reinforcement (6½ in. of the 9-in. depth), and the other placed concrete for the lift above the reinforcement. A Jaeger screw-type spreader, two transverse finishing machines, and one longitudinal float machine followed the pavers.

A batching plant was established at a railroad siding near to the northerly end. Sand and gravel aggregate, used in the concrete mix, were trucked to

★ Jaeger screw spreader on inside south-bound lane. Air-entraining portland cement concrete used here—slump 2½ in. Sand-aggregate ratio 35%. Water-cement ratio 5.00 gal. Avg. air content 4.5%

★ Inside south-bound lane, showing general consistency of the air-entraining portland cement concrete (slump 2½ in., air 4.5%)



★ Spade-type slab-end support used at transverse expansion joint

★ Showing two finishing machines, longitudinal power float, and wood belt. Finishing transverse expansion joint in background

★ PCA air indicator for determining air-entrainment by pressure method. 1/3 cu. ft. unit weight measure and dial scale for determining yield and air entrainment by gravimetric method (air content on date of photo was 4.51 by air meter and 4.34 by gravimetric)

the batching plant from a nearby commercial source and cement was delivered by rail. All of the cement was received in bulk, except the natural types.

High Daily Yardage

This modern assortment of equipment resulted in high daily pavement runs. The average was about 2500 lin. ft. of 12-ft. by 9-in. lane pavement per day, with peak days over 3300 ft. This is a great increase over that customarily produced in the prewar days and indicates that the trend is denitely toward large and well organized paving contracts. Credit for the steady high output is due to the balanced use of a single and dual drum paver plus supporting equipment also so nearly balanced that production became an uninterrupted straightaway process.

Resident engineer for the New York State Department of Public Works is Walter J. O'Brien. The project is being supervised by DPW district 5, Buffalo, Charles R. Waters, district engineer, under the direction of State Superintendent Charles H. Sells.

Contract Items on Olean-Hinsdale, N. Y., Project Described in Accompanying Article

Awarded Sept. 5, 1946 to Bero Engineering and Contracting Corp., Buffalo, N. Y.

Item	Measure	Unit Price	Quantity
Clearing and grubbing	L. S.	23,500.00	Nec.
Unclassified excavation	C. Y.	0.60	311,800
Trench, culv. and bridge excav.	C. Y.	1.55	8,800
Trimming shoulders	L. F. Rd.	0.45	29,000
Preparing fine grade	S. Y.	0.20	163,300
Sewer pipe conc. 12" diam.	L. F.	2.25	2,600
Sewer pipe conc. 18" diam.	L. F.	3.25	200
Pipe underdrain 4" diam.	L. F.	0.35	240
Pipe underdrain 6" diam.	L. F.	0.45	5,010
Corr. metal pipe 12" diam.	L. F.	3.75	870
Corr. metal pipe 18" diam.	L. F.	4.65	210
C. I. P. 18" diam.	L. F.	4.50	430
Sp. R. C. P. opt. 18" diam.	L. F.	4.50	520
Sp. R. C. P. opt. 24" diam.	L. F.	6.00	750
Sp. R. C. P. opt. 36" diam.	L. F.	10.50	120
Portland cement	Bbl.	2.60	40,000
Natural cement	Bbl.	2.95	1,650
Daragg Puzzalan	Bbl.	2.95	4,000
Portland cement (neutralized Vinsol resin)	Bbl.	2.60	21,900
Concrete for structures	C. Y.	32.50	1,203
First class concrete	C. Y.	30.00	1,195
Second class concrete	C. Y.	30.00	200
Screened gravel No. 2 size	C. Y.	3.25	140
Metal reinf. for conc. pavt.	S. Y. P.	0.35	157,550
Metal reinf. for culverts	S. F.	0.25	1,520
Steel fabric reinforcement	S. Y.	0.35	800
Reinf. for conc. pavt.	Lb.	0.10	19,520
Opt. trans. joint support	L. F. Jt.	0.65	17,700
Longitudinal joint supports opt.	Each	0.60	22,060
Bar reinf. for structures	Lb.	0.09	138,750

(*Continued on next page*)

(*Continued from page* 82)

Spiral bar reinforcement	Lb.	0.50	4,000
Structural steel	Lb.	0.12	162,000
Miscellaneous iron and steel	Lb.	0.20	6,775
Pile shoes	Each	2.00	145
Resetting cable guard rail	L. F.	1.00	1,270
Opt. guard railing	L. F.	1.65	9,350
Guide posts	Each	6.00	615
Resetting guide posts	Each	3.50	27
Metal railing	L. F.	14.00	230
Found. course R. O. B. gravel	C. Y.	1.90	33,300
Cement conc. pavement	C. Y.	7.65	38,175
Cement conc. pavement	C. Y.	8.25	1,290
Top crse. bit. mac. M. M. opt.	Ton	10.50	725
Bit. material waterproofing	Gal.	1.00	625
Memb. waterproofing without P. C.	S. Y.	2.00	870
Maint. traffic at culverts	L. S.	2,500.00	Nec.
Maint. traffic	L. F.	0.25	92,900
Maint. traffic for bit. mac.	L. F. Rd.	0.25	1,270
Protection for traffic	L. S.	5,000.00	Nec.
Maint. 2-way traffic at br. sites	....	.....	.....
Br. L. S. H. 5137	L. S.	2,500.00	Nec.
Dry riprap	C. Y.	7.50	210
Remov. br. superstructure Br. 2 S. H. 5137	L. S.	2,750.00	Nec.
Cofferdams, pump, bail and drain	L. S.	7,500.00	Nec.
Untreated timber test piles	L. F.	1.75	270
Untreated timber piles	L. F.	1.50	12,290
Furnish, equip for driving piles	L. S.	750.00	Nec.
Screened gravel L. M. No. 2 and 3 sizes	C. Y.	350.00	650
Conc. curbing Type E	L. F.	1.85	1,000
Conc. gutter	S. Y.	3.50	80
Conc. R. O. W. markers	Each	5.00	220
Conc. sidewalk	S. Y.	3.50	280
Timber and lumber	MFBM	165.00	11
Relaying old pipe	L. F.	2.00	500
Highway railroad barricade	L. F.	2.50	120
R. O. B. gravel backfill	C. Y.	3.00	6,275
R. R. approach warn. signs, reflect. type	Each	100.00	2
Furnish. store and spread top soil	C. Y.	1.50	1,000
Seeding	S. Y.	0.08	7,370
Sod	S. Y.	1.25	90
Transplanting exist. trees, shrubs or vines	Each	6.50	77
Acer Platanoides, 2¼" to 2½" calip.	Each	7.50	390
Ulmus Americana, 2¼" x 2½" calip.	Each	7.50	40
Salix Vitellina Pendula, 10' to 12' high	Each	6.50	30
Sorbus Aucuparia, 1¾" to 2" calip.	Each	6.50	75
Removing and storing iron fence and posts	L. S.	1,500.00	Nec.
Bot. course br. stone or slag	C. Y.	6.85	516
Disposal of buildings	L. S.	241.90	Nec.
Relocating buildings	L. S.	24,100.00	Nec.
Contract total		$1,199,551.85	

Safety Tips for Winter Maintenance Crews

New Jersey's highway commissioner, Spencer Miller, Jr., has enlisted his state's roadbuilding and winter maintenance forces to set safety standards for the driving public.

Such practices as riding on truck mudguards, with the danger of fatalities in sudden stops or turns, and other indiscretions are listed in the department's Safety Manual for year-around guidance. Largely as a refresher course a brief supplementary bulletin has been prepared for the most dangerous time of the year. In short form it restates regulations from the Safety Manual compiled by Charles I. Levine, Highway Department Claims Administrator. Among other provisions:

When spreading abrasives or other material on ice covered roads be careful not to toss them against passing vehicles.

When visibility is poor in fog, rain or snowstorms, turn on lights even in daylight hours. Use depressed beam and blinker—not a spotlight.

Place red flags on rear of slow moving equipment to warn over-taking traffic.

Bring snow plows to complete stop if necessary for safety of others. Do not obscure their vision by flying snow or break windshields by chunks of ice hurled through the air.

Reduce speed when approaching frozen masses of snow.

A.E.D. 29th Annual Meeting

See you there Feb. 15-19, Chicago

The 29th Annual Meeting of the Associated Equipment Distributors, association of construction equipment distributors and manufacturers, will be held in Chicago Feb. 15-19. Harry J. Hush, New York, chairman of the convention committee, indicates that the number of member companies to be represented may break all previous records.

Mayor Martin J. Kennelly, a leading Chicago businessman, will deliver a message of welcome at the opening session, followed by a comprehensive program confined largely to topics of common interest to manufacturers and distributors.

Some 2½ days will be devoted to discussion and talks on business problems. The remaining time will be open for sales meetings and discussion groups arranged by the various manufacturers with their distributors.

The Convention Committee will meet in Chicago early in December with A.E.D. President W. A. Danner, Boston, to complete the program and final meeting plans. Committee includes G. F. Lowe, Chicago; Jack How, San Francisco; F. J. Fitzpatrick, Hyde Park, Mass.; and E. H. Kliebenstein, Ridgefield, N. J. Frank G. Knight, A.E.D. Executive Secretary and Paul F. Cassady, Assistant Secretary of Chicago, will also attend the Convention Committee meeting.

•

Ohio has joined the honor roll of states having constitutional amendments barring diversion of highway user taxes to other than road use. The Good Roads Amendment there was passed in November 1,025,800 to 662,579, a margin of 363,221 votes. Ohio was the 20th state to pass an anti-diversion amendment. At least two states, Massachusetts and Tennessee, vote on full anti-diversion amendments next year.

Our editorial comment consists of saying, "Congratulations, Ohio." Now, let's look to New York, which still diverts motor funds while needing new revenues to meet its 2 billion dollar highway need; and to offer states where anti-diversion amendments are needed in some instances in prospect.

Mail Inserted Card or Inquiry Blank (page 129) for Equipment Data

Again this issue of Roads and Streets carries descriptions of many new labor-saving efficiency devices and latest material developments. See our New Equipment and Materials Section beginning on page 110, for which a numbered reply card has been inserted to help you request data on items that interest you. Also on page 129 is an inquiry blank and advertisers' index which will help you get data on equipment and materials you need.

★ 4 jackhammers were operated by one air-control valve. Hydraulic cylinder raised and lowered cutting bits

How Boise

Contractors used gang mounted battery of jackhammers, heater-planer and other noteworthy equipment to expedite work in business district.

By H. K. Glidden

Contributing Editor

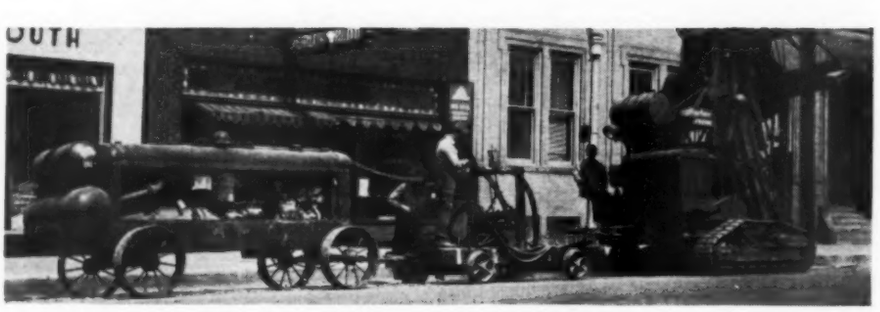
Police Chief Reports Traffic Conditions Considerably Improved by New Traffic Lights and Wider Streets.

BOISE, Capital of Idaho, recently experienced growing pains along with many other cities. While many of Boise's municipal facilities are outmoded, they are being made to suffice pending the outcome of bond elections. Traffic congestion in its downtown areas passed the put-it-off stage immediately after the war. Widening and modernizing existing streets was chosen as the first step in alleviating traffic conditions. Other steps may have to be taken later.

J. A. Terteling and Sons of Boise fought unseasonable weather and Christmas shopping crowds to complete their $140,000 street-widening contract. Terteling subcontracted subgrade preparation and hot-mix work to Tom McCorkle Construction Co. of Boise.

City Electric Co. of Boise was the contractor for a new and modern system of separate vehicular and pedestrian control lights costing about $80,000.

As the final step in this modernization program, Morrison-Knudson Co. of Boise planed and resurfaced a number of the widened streets as well as other streets and alleys in the downtown area.



★ Terteling mounted 4 jackhammers on movable platform to expedite skim cut old Warrenite pavement. Ditcher was used to pull rig because of slow speed required

★ First operation in widening Boise streets was breaking up and removing old curb and excess sidewalk. Tractor-mounted loader worked well in congested streets

Holidays Bad for Widening

Terteling's contract involved 30 blocks of pavement and 22 intersec-

★ This picture illustrates several of the problems encountered and shows new curb in place. Hotel canopy was one of several which required narrowing in width. In the foreground can be seen entrance to store basement which extends under pavement. No-parking signs were generally ignored

Widened and Modernized its Streets

tions. There were 29 bid items, including 4,710 cu. yd. excavation; removing and replacing 17,810 lin. ft. curb and gutter; removing 18,936 sq. yd. pavement; laying 1,900 tons plant mix; and relocating 9,500 ft. of street light duct.

Among the extras were relocation of public utilities, rebuilding basement walls, and reducing the size of canopies. While some of this work was included in the original proposal, a subsequent legal decision made it necessary for the property owners to bear all such remodeling expenses. Terteling was successful in negotiating for all this type of work, although the choice of contractor was optional with the owner.

All of the streets widened had 80-ft. rights of way. Some streets were 44 ft. wide with 18-ft. sidewalks. Others were 40 ft. wide with 20-ft. sidewalks. All streets were widened to 52 ft. and boulevards to 60 ft. Sidewalks were reduced to 14 ft. and 10 ft. accordingly.

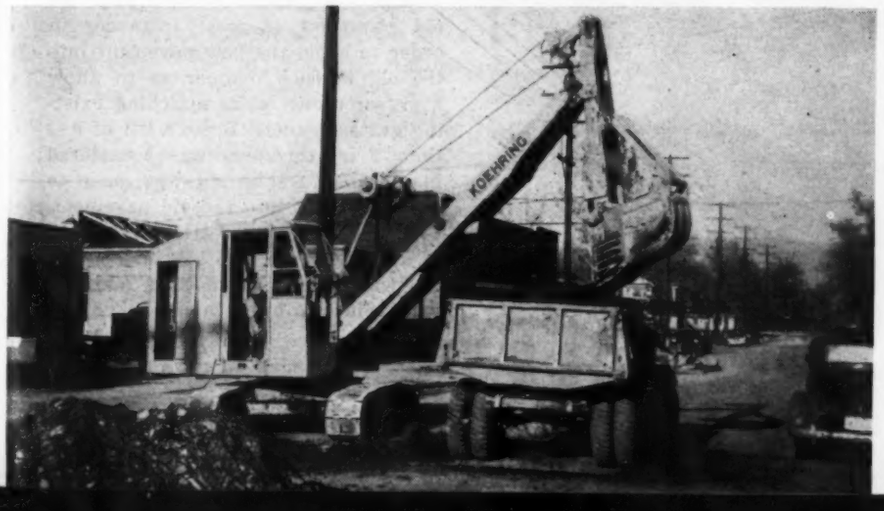
N. P. Cushing, Terteling's superintendent, says it was a good job except for the weather. Semi-arid Boise received more than its normal share of rainfall while work was in progress during the latter part of 1946 and early 1947. Having no storm sewer system, Boise depends on valley gutters and syphons to handle surface water runoff. Water is literally chased from one intersection to another. Lacking convenient outlets, Terteling was forced to use pumps to remove water from low spots.

Pedestrians and motorists paid a minimum amount of attention to Terteling's signs or barricades. Mr. Cushing advises against undertaking projects of this nature during holiday periods when crowds may be expected

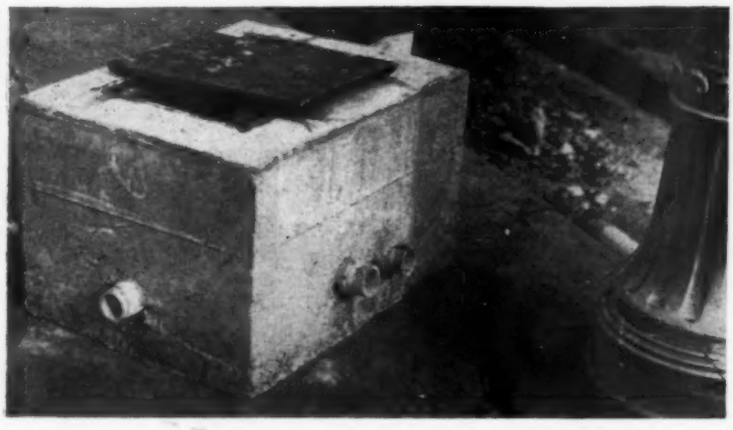
★ Widening required relocation of existing underground cables and ducts. Manholes were raised to meet new grade

★ A specially designed butting edge was installed on motor patrol blade to excavate area between new curb and old pavement to proper depth and shape. Excavated material was shoved to center of street for removal by tractor-mounted loader and dump trucks

★ Basements extending out to old curb line were all narowed up to new curb line by pouring a new outer wall. In this picture reinforcing rods are shown protruding above new wall. Workmen are shown removing old sidewalk and lowering old wall preparatory to pouring new curb. Reinforcing rods were later bent over to form reinforcing for gutter section which was poured over the filled-in portion of the basement



★ Utility companies took advantage of street widening to modernize their underground installations. Back hoe is shown digging trench for multiple cell telephone duct

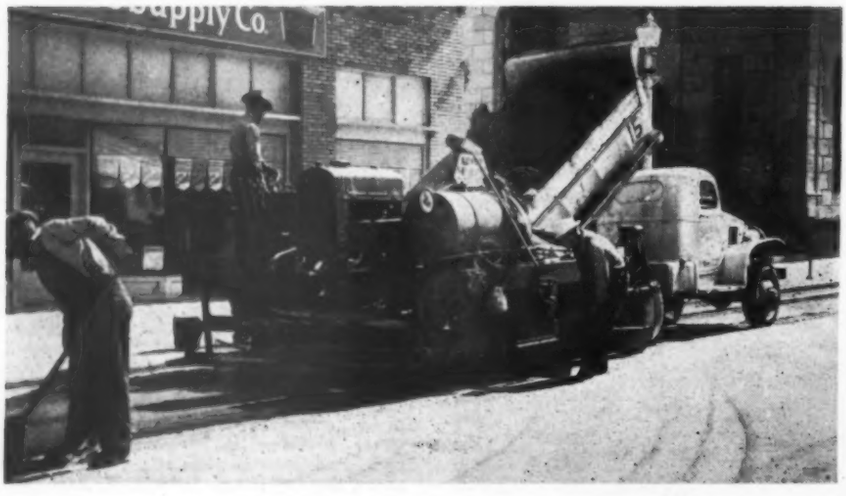


★ Rubber-tired loader performed a variety of tasks such as using its hoist feature to place precast concrete junction box

★ Truck-mounted crane handled clam shell on many excavation jobs such as digging sewer trench shown here. Same crane operated skull cracker to break up curbing and sidewalk

★ Precast concrete bases were used for street light standards

★ Street lighting system junction boxes were precast concrete



★ Adnun paver was used to spread surface course

on the streets. It proved to be almost impossible to keep people off of the tack coat.

Special Pavement Chipping Problem

A feathering lift varying from 2 ft. to 4 ft. wide was necessary over the old pavement in most instances in order to blend the new pavement into the old in such manner as to allow a proper crown while matching existing gutter grades. Since a lift of less than 1 in. thickness was considered inadvisable, a skim cut was made to notch this lift into the old pavement. The 4-ft. widening section consisting of a gravel base and 1½ in. hot-mix top was no problem as this material was placed by standard paving methods.

(*Continued on page* 88)

LEONARDO MIGHT HAVE FLOWN

LEONARDO DA VINCI'S genius conceived a technically sound airplane and even the principle of the cylinder and piston (the latter in a steam cannon). But nearly four centuries passed before powered flight was a reality at Kittyhawk. So far was he ahead of the world that no man lived who could take up the torch which he kindled in the world's struggle for emancipation from creeping travel and crushing toil.

Today, internal-combustion power is a servant of man in a thousand ways that even a Leonardo could not have conceived. The matériel of agriculture, commerce and industry moves freely through the world's trade channels on planes, ships, trains and trucks powered by gasoline and Diesel engines. Construction, re-construction, eventual world abundance are within reach with internal-combustion engines at their specialized tasks.

AMERICAN BOSCH CORPORATION, SPRINGFIELD 7, MASS.

SERVING POWER WHICH SERVES MANKIND

American Bosch serves the internal-combustion-engine industry in three vital ways:

ENGINEERING. 1,200,000 *man-hours* of it have been poured into Diesel fuel injection alone—other millions into ignition.

PRODUCTION. *Premium performance* has been a consistent goal in the production of hundreds of thousands of Diesel injection systems and millions of electrical units.

MAINTENANCE. *The world over,* American Bosch authorized service stations keep the equipment operating efficiently.

AMERICAN BOSCH

PARTNERS IN THE PROGRESS OF POWER

DIESEL FUEL INJECTION • AUTOMOTIVE AND AVIATION ELECTRICAL PRODUCTS

★ Boise's storm water is carried by curb and gutter with syphons at intersections. When widening operations interfered with the syphons, portable pumps handled the heaviest rainfall in this semi-arid country

★ (Left): Gasoline-operated tamper compacted cold-mix asphalt backfill for duct trenches cut in pavement. (Right): Motor patrol equipped with scarifier teeth removed skim cut

Accompanying pictures show how Terteling rigged 4 jackhammers on a movable platform to loosen the skim cut. A motor patrol equipped with scarified teeth removed the loosened material. It was a noisy rig which progressed about 1,200 ft. per day. A ditcher did the pulling as it proved to be the only piece of equipment geared to run slow enough for this job. Mr. Cushing says that there must be a better way of making a skim cut, but he doesn't know what it is, especially with labor scarce.

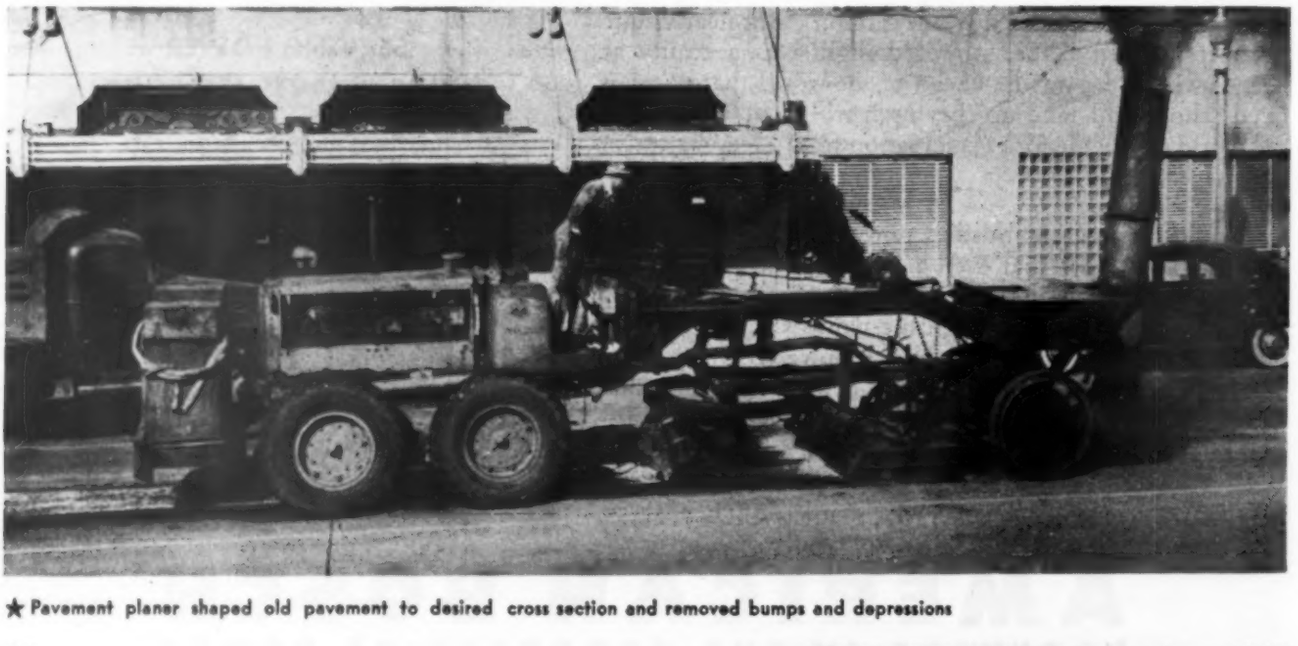
Four pedestrian and 4 vehicle stop lights were installed at each intersection. Each light is visible only in the area over which it is intended to be effective. Vehicle lights are so located and shielded as not to be visible to pedestrians. This type of installation makes it impossible for the pedestrian to become confused as to which light governs his movements.

All of the lights are interconnected and their operations are controlled from the police station and a master control box. It is a simple matter to vary the stop and go interval of the lights. This is done at various times throughout the day according to the direction in which the largest amount of traffic is flowing at that time. Traffic speed can be varied from 12 to 30 mph. The controls allow all lights to be turned red during a police or fire department emergency.

Streets Planed, Resurfaced

After the street widening project was completed, the need for smoothing and leveling became more apparent. The relocation of public utility installations, installing cable ducts, and the accumulated scars of years of pavement patching had left the streets in an unsightly condition and difficult to clean. Heavy traffic had caused some alley pavement to fail badly.

Morrison-Knudson Co., Inc., was awarded the contract for this final phase of the street improvements. M-K employed the Pavement Planing Co. of Salt Lake to handle the smoothing and shaping of the street surfaces. They used their own equipment to resurface several blocks of pavement and to repave a number of alleys. Except for badly worn sec-



★ Pavement planer shaped old pavement to desired cross section and removed bumps and depressions

tions the pavement planer left the surface of the pavement sufficiently smooth so that no further work was needed.

Traffic Conditions Improved

Chief of Police, R. G. Haskins, stated that the pavement widened has materially reduced minor accidents and has speeded the flow of traffic appreciably. While Chief Haskins feels that 52-ft. width is entirely workable, he feels that 54 ft. would be much better. In explaining the method used in setting off the traffic and parking lanes, he pointed out that 9 ft. is proving to be adequate for the center lanes, but that the inside lane should be slightly wider in order to allow more room in which motorists can maneuver while parking. Boise provides a 7-ft. width for parallel parking and parking meters are 18 to 19 ft. apart.

Commenting on the pedestrian walk-wait lights, Haskins stated that the installation of these lights resulted in much better pedestrian observance of traffic laws. Double parking prevails in spite of police efforts to stop it. This, together with vehicles pausing to unload, materially reduces the efficiency of the inner lane for moving traffic.

William D. "Wild Bill" Alexander, recently returned to duty as a Lt. Col. in the U. S. Engineers, handled the job for the city's engineering firm.

★ Tractor-mounted loader removed planed-off material

Most Traffic Problems of Cities Simple to Solve, Yale Expert Says

Most traffic delay in cities can be eliminated simply by applying existing knowledge of traffic controls, a Yale University expert believes.

According to Prof. Elroy L. Erickson, the intersection is the major bottleneck to which more than three-quarters of all traffic delays in cities is attributable. But he says if highway engineers utilize currently available knowledge, many of these bottlenecks can be avoided.

Parking Is Big Intersection Problem

In a recent radio address, Dr. Erickson pointed out that often "the simple expedient of clearing parking from the curbs at intersections will speed up traffic movement through the intersection."

He continued:

"In older cities, where relatively narrow streets are the rule, there is frequently only room for one traffic lane in each direction in addition to parking lanes on each side.

"By removing parking near the corner in such cases the signalized intersection capacity can often be nearly doubled with the same signal timing because two lines of traffic rather than one are given the opportunity to utilize the green time."

Technical Report Available From Yale

Dr. Erickson said that the reason for not removing parking at such places is often traced to maintenance of self-interest by persons who want the parking to continue to be available.

Yale University's Bureau of Highway Traffic has available a technical report which contains much of the material on which, Dr. Erickson said, traffic improvement plans can be based.

Mechanical Traffic Cop Automatically Decides Crossing Priority

New Jersey's first installation of a "perfect mechanical traffic cop" has been ordered for the Route 25 (U. S. 1) Lawrence Avenue intersection in Rahway, Union County. It was recommended by James L. Hays, highway department electrical engineer, as a "fully actuated traffic dispatcher system" to reduce unnecessary delays in frequent changes of "stop-go" signals.

Like a policeman the mechanism "will look the situation over" and give a longer "green-go" period to the road carrying the heaviest travel volume. Detectors in the roadway, about 300 ft. from the light, will count the number of vehicles approaching on both the State artery and Lawrence Avenue and will "telegraph" the priority for right of way. This feature will eliminate the frequent tie-ups that follow when the signals change although no vehicles are waiting on the cross-road.

Records of W. R. Bellis, chief of planning and economics, show that Route 25 here carries 34,000 vehicles per day north and 29,000 south of the junction. But Lawrence Avenue, east of Route 25 is used by only 6,000 vehicles per average day and west of Route 25 by 2,000 vehicles.

Numerous timings have been used for the Route 25-Lawrence Avenue traffic signal, Mr. Hays said in his report, which showed that traffic could not be moved without confusion with present equipment.

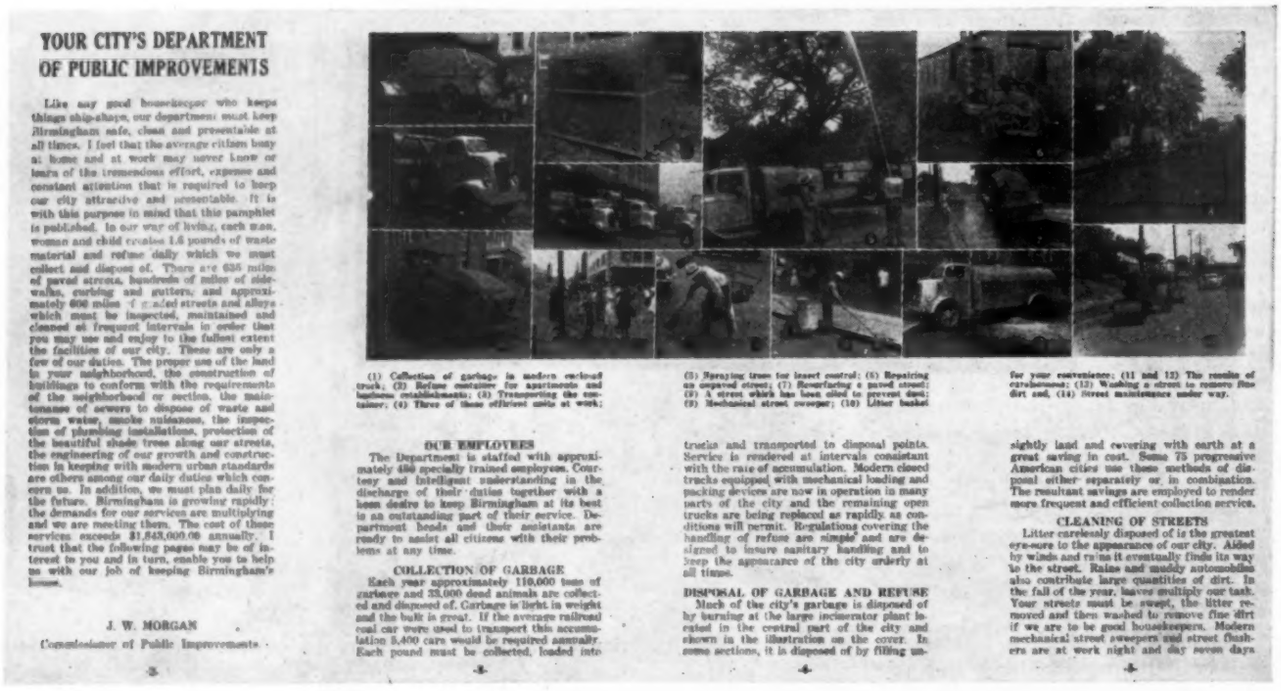
Meetings Ahead

National Material Handling Exposition, Cleveland, Jan. 12-16.

American Road Builders' Association—annual convention, Washington, D. C., Jan. 26-28. (1948 road show July 16-20, Soldier Field, Chicago.)

Associated General Contractors of America, Inc.—29th annual convention, Dallas, Texas, Feb. 9-12, 1948.

Associated Equipment Distributors —Annual meeting, Edgewater Beach Hotel, Chicago, Ill., Feb. 15-19.



YOUR CITY'S DEPARTMENT OF PUBLIC IMPROVEMENTS

Like any good housekeeper who keeps things ship-shape, our department must keep Birmingham safe, clean and presentable at all times. I feel that the average citizen busy at home and at work may never know or learn of the tremendous effort, expense and constant attention that is required to keep our city attractive and presentable. It is with this purpose in mind that this pamphlet is published. In our way of living, each man, woman and child creates 1.6 pounds of waste material and refuse daily which we must collect and dispose of. There are 635 miles of paved streets, hundreds of miles of sidewalks, curbing and gutters, and approximately 600 miles of graded streets and alleys which must be inspected, maintained and cleaned at frequent intervals in order that you may use and enjoy to the fullest extent the facilities of our city. These are only a few of our duties. The proper use of the land in your neighborhood, the construction of buildings to conform with the requirements of the neighborhood or section, the maintenance of sewers to dispose of waste and storm water, smoke nuisances, the inspection of plumbing installations, protection of the beautiful shade trees along our streets, the engineering of our growth and construction in keeping with modern urban standards are others among our daily duties which concern us. In addition, we must plan daily for the future. Birmingham is growing rapidly; the demands for our services are multiplying and we are meeting them. The cost of these services exceeds $1,843,000.00 annually. I trust that the following pages may be of interest to you and in turn, enable you to help us with our job of keeping Birmingham's house.

J. W. MORGAN
Commissioner of Public Improvements

-3-

(1) Collection of garbage in modern enclosed truck; (2) Refuse container for apartments and business establishments; (3) Transporting the container; (4) Three of these efficient units at work;

-4-

(5) Spraying trees for insect control; (6) Repairing an unpaved street; (7) Resurfacing a paved street; (8) A street which has been oiled to prevent dust; (9) Mechanical street sweeper; (10) Litter basket for your convenience; (11 and 12) The results of carelessness; (13) Washing a street to remove fine dirt and, (14) Street maintenance under way.

-5-

OUR EMPLOYEES

The Department is staffed with approximately 450 specially trained employees. Courtesy and intelligent understanding in the discharge of their duties together with a keen desire to keep Birmingham at its best is an outstanding part of their service. Department heads and their assistants are ready to assist all citizens with their problems at any time.

COLLECTION OF GARBAGE

Each year approximately 110,000 tons of garbage and 23,000 dead animals are collected and disposed of. Garbage is light in weight and the bulk is great. If the average railroad coal car were used to transport this accumulation 5,400 cars would be required annually. Each pound must be collected, loaded into trucks and transported to disposal points. Service is rendered at intervals consistant with the rate of accumulation. Modern closed trucks equipped with mechanical loading and packing devices are now in operation in many parts of the city and the remaining open trucks are being replaced as rapidly as conditions will permit. Regulations covering the handling of refuse are simple and are designed to insure sanitary handling and to keep the appearance of the city orderly at all times.

DISPOSAL OF GARBAGE AND REFUSE

Much of the city's garbage is disposed of by burning at the large incinerator plant located in the central part of the city and shown in the illustration on the cover. In some sections, it is disposed of by filling unsightly land and covering with earth at a great saving in cost. Some 75 progressive American cities use these methods of disposal either separately or in combination. The resultant savings are employed to render more frequent and efficient collection service.

CLEANING OF STREETS

Litter carelessly disposed of is the greatest eye-sore to the appearance of our city. Aided by winds and rains it eventually finds its way to the street. Rains and muddy automobiles also contribute large quantities of dirt. In the fall of the year, leaves multiply our task. Your streets must be swept, the litter removed and then washed to remove fine dirt if we are to be good housekeepers. Modern mechanical street sweepers and street flushers are at work night and day seven days

Leaflet Explains City Public Improvement Department's Functions

Reproduced here is the inner side of what strikes us as being an unusually effective folder for promoting public good will and understanding. It is published by J. W. Morgan, director of public improvements, Birmingham, Ala. On the opposite side from that shown is a title sheet and a continuation of the simple, readable printed message. The title, by the way, is "Birmingham's Housekeeping."

Every city's public works department has a many-sided selling job. We're not speaking merely of political bally-hoo around election time, but of the need for keeping the public enlightened and cooperative—of showing them what they are getting for "what they pays." Day-by-day education along such legitimate channels as that represented by this folder is sure to be repaid in better public support of necessary civic activities. Mentioned are garbage collection and disposal, street cleaning, paving, sewers, zoning, plumbing inspection, tree preservation, smoke abatement, and engineering.

This folder, incidentally, is just that—a leaflet that folds to pocket size and is inexpensive for attaching to routine correspondence, enclosing with bills and notices, etc. No fancy, tricked-up arty effect, just a straight, sincere description of what the D. of P. I. is and does, what citizens can do to contribute to the effectiveness of their city's program, how they can get help.—*Editor.*

Tacoma Narrows Bridge

(*Continued from page* 73)

tion of parts of the former piers, anchorages and approaches, which were found to be intact, and which cost $3,000,000. Model studies indicated that where the first bridge actually shook itself to pieces, the new structure would have an approximate total movement of 6 in. at the chords, which is to be expected in any suspension type bridge.

Engineers constructed a full scale model of the new bridge designed according to the lessons and ideas learned from the wind tunnel research. They subjected the model to winds up to 100-miles per hour, with entirely satisfactory results. The new bridge, they guarantee, "will not fall down."

Deep open tresses will be incorporated in the new structure in place of the solid, plate girder stiffening design of the first bridge. In place of the conventional, plate girder floor beams they will employ an open trussed floor type. The frontal area will be reduced and broken into many small parts instead of one large commanding area as used on the original structure. This will set up a condition in which the aerodynamic forces would tend to fight or nullify each other and, at the same time, reduce drag. Engineers have also designed a new type, streamlined rail section which will further eliminate built-up wind pressures. The use of open steel grid slots of varying widths constructed between each of the 4 traffic lanes and at the curbs will permit air currents to pass vertically, just as the open rail section and open tresses permit horizontal air flow, thus further reducing or eliminating wind pressures on the bridge.

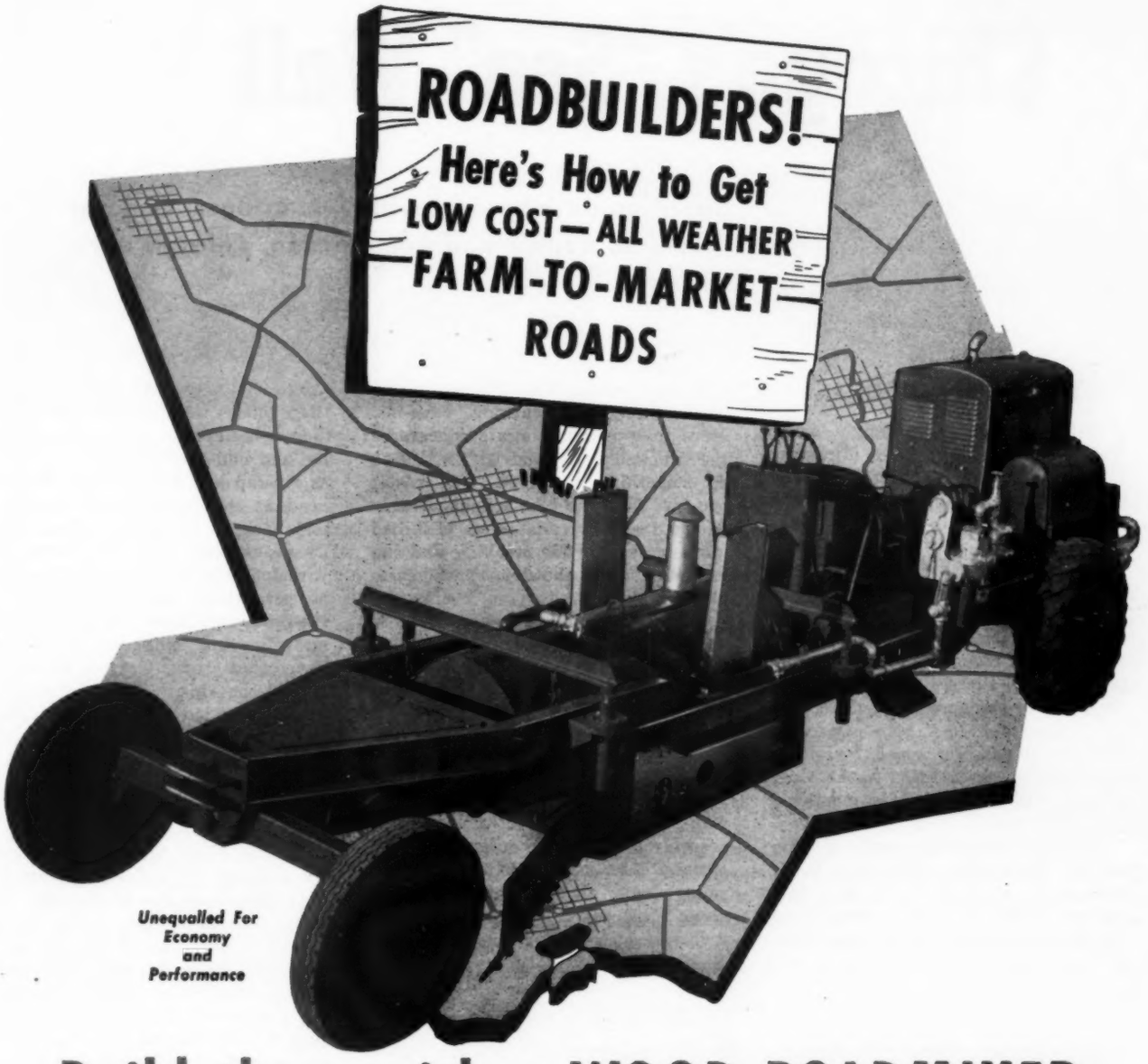
Wind Resistance Data

According to Mr. Andrews: "The principles of aircraft makers in decreasing wind resistance can be successfully applied to suspension bridge design. The wind tunnel research with bridge models proved this fact. In the same manner that plane makers have eliminated wing flutter, the bridge maker can eliminate wind pressure.

"Wing flutter is analogous in many ways to oscillation in a suspension bridge, except that the type of airflow around a perfectly formed wing is entirely different from that to be expected around blunt or rectangular forms, such as must be used in a practical bridge form.

"The research carried on in the Washington wind tunnel not only proved that a safe Tacoma Narrows Bridge is entirely feasible, but it provided knowledge highly useful in determining the degree of safety in other suspension structures throughout their lifetime.

"Had the wind tunnel been in existence before the original bridge was designed, its serious defects would have been discovered. For want of a $100,000 wind tunnel, a $6,400,000 bridge was lost."



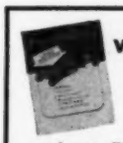
Build them with a WOOD ROADMIXER

The Wood Roadmixer Model 36 meets perfectly the specific requirements of county and state for "FARM-TO-MARKET ROADS." It makes possible permanent, all weather roads, low in initial cost, low in maintenance cost.

Using native materials or existing gravel bases, it mixes in one pass all types of soils or aggregates with any kind of liquid binder used in mixed-in place pavement construction. The Roadmixer takes these materials from prepared windrows, mixes it completely for laydown.

One man operated, the Wood Roadmixer Model 36 can handle as many as 125 tons of mix per hour. The Model 36 is self-propelled, requires no transport equipment—can be off to the next job at 12 M.P.H.

Investigate today, the low cost possibilities of the Wood Roadmixer Model 36 for your all-weather Farm-to-Market Roads.



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Chicago's "Sea" Wall

Based on an interview with J. L. Bridges, General Foreman, Repair and Construction, Chicago Park District

By Douglas H. Dyer

CHICAGO has twenty-eight miles of shore line on Lake Michigan. Its Outer Drives, carrying 75 to 100 thousand cars a day to and from the "Loop," run within sight of Lake Michigan and are well known to tourists from all over the globe. Chicago's beautiful sandy beaches provide healthful exercise for the millions of residents of the area. But the beaches cover only a comparatively short distance of the shore line. The rest of the distance has deeper water because the waterfront has been gradually filled in to provide space for parks and parkways in addition to the outer drives which carry the faster-moving through traffic.

Waves rolling up on sandy, sloping beaches spend themselves harmlessly but given a steep bank or piling against which to pound, they exert terrific momentary impact pressures. If they break through or over, the backwash carries with it some of the earth, eventually causing cave-ins. More than a decade ago engineers of the Chicago Park District decided to do something about it. The result was two-fold: the lake is held securely within its banks and miles of broad stone walks provide strolling and sun bathing for all who enjoy such recreation.

Old Rip-Rap Durable

The original retaining wall was made up of round wood piling and some sheet steel. One row of piling (called the bulkhead) was driven in deep water, a second was driven just back of the water's edge. A timber-whaler, made of 12"x12" timbers, was securely bolted to the outer piling and tied by 1-in. steel rods to the inner piling back about 15 ft. One-man stone filled the area between pilings and was covered with heavy blocks of Bedford limestone which were approximately 4'x4'x4'. At one section these blocks were just dumped to provide a buffer for the waves. Irregular and odd-shaped blocks were used as rip-rap and dumped into the bulkhead at the water's edge on top of and back of the outer piling. After 25 years they were found to have withstood the pounding of waves with no perceptible movement. When the rip-rap was placed where there was no piling, or bulkhead, it was believed that scouring action around the toe of the rip-rap fill might have a tendency to loosen the rip-rap, allowing it to slip farther into the lake. Later inspections proved this was not the case. The rock was firm, so the present structure was erected on the original rip-rap.

In 1936, WPA forces working under the Chicago Park District started at 55th Street on the south side. This work was to set the 6 to 6½ ton blocks to form walkways for a distance of one-half mile. This proved highly satisfactory and was continued for a mile between 31st and 39th Sts., plus a mile around the Planetarium, and a final 1½ miles between Belmont and Montrose Aves. In July, 1943, the Chicago Park District started work again on a small scale at 59th St. and in 1944 on the stretch from Montrose to Foster Aves. Resumption of the work was necessary because the rising level of Lake Michigan was increasing shore line damage. Today the lake level is 3 ft. higher than is ordinarily considered normal.

★ Crane picks up block from pile and places it in seemingly endless row. Broken and irregularly shaped blocks are cast into lake for rip-rap to protect toe of structure where there is no bulkhead

New Rip-Rap Details

In preparing to set the limestone blocks, the rock fill (of one-man stones), which was above the original lake level, or elevation zero, is removed from behind the bulkhead down to the normal lake level. This job is handled by ordinary clamshell crane. Where possible the stone structure of six separate rows of blocks is set with the four outer rows at elevation + 4, the next row at elevation + 6.0, and the back row at elevation

★ (Left): Truck transfers concrete to distant location but is not used for regular pouring of concrete. (Right): Wooden bulkheads (left foreground) form pocket between blocks to hold concrete until it sets

+ 8.0. Where the bank is steep, blocks are set in rows 2 ft. above each other. Elevations are held to 2 ft. to permit easy climbing.

Wider Block Spacing

When WPA work of setting blocks was first started, it was believed that the best spacing was a distance of 3 to 6 in. between blocks. However, it was discovered after several years that the small amount of concrete holding the blocks together would not withstand contraction and expansion caused by extremes of temperature. Cracks resulted and the water action speeded the loosening of the blocks. By spacing the blocks at a distance of 12 to 15 in., a larger volume of concrete can be used and this makes a more permanent structure. This concrete is made of the usual 2-4-6 aggregate mix.

The actual setting of the blocks is a simple operation. Bedding stone, of 4"x8" white limestone quarried in Chicago, is dumped from trucks on the bank and the clamshell crane places it to fill in the voids. There is little hand shovel work. A block is picked up by a crane, steadied over the space, and then dropped from a height of 3 ft. to give it a firm footing in the bedding stone. In setting the rows of back blocks on the earthen bank, the block is dropped then raised while workmen throw a dozen or more bedding stones on the spot where it will rest. When the block is dropped again it is ready to be concreted in place. Broken and irregular blocks are dumped just outside the bulkhead to act as rip-rap.

Basket-type Sling

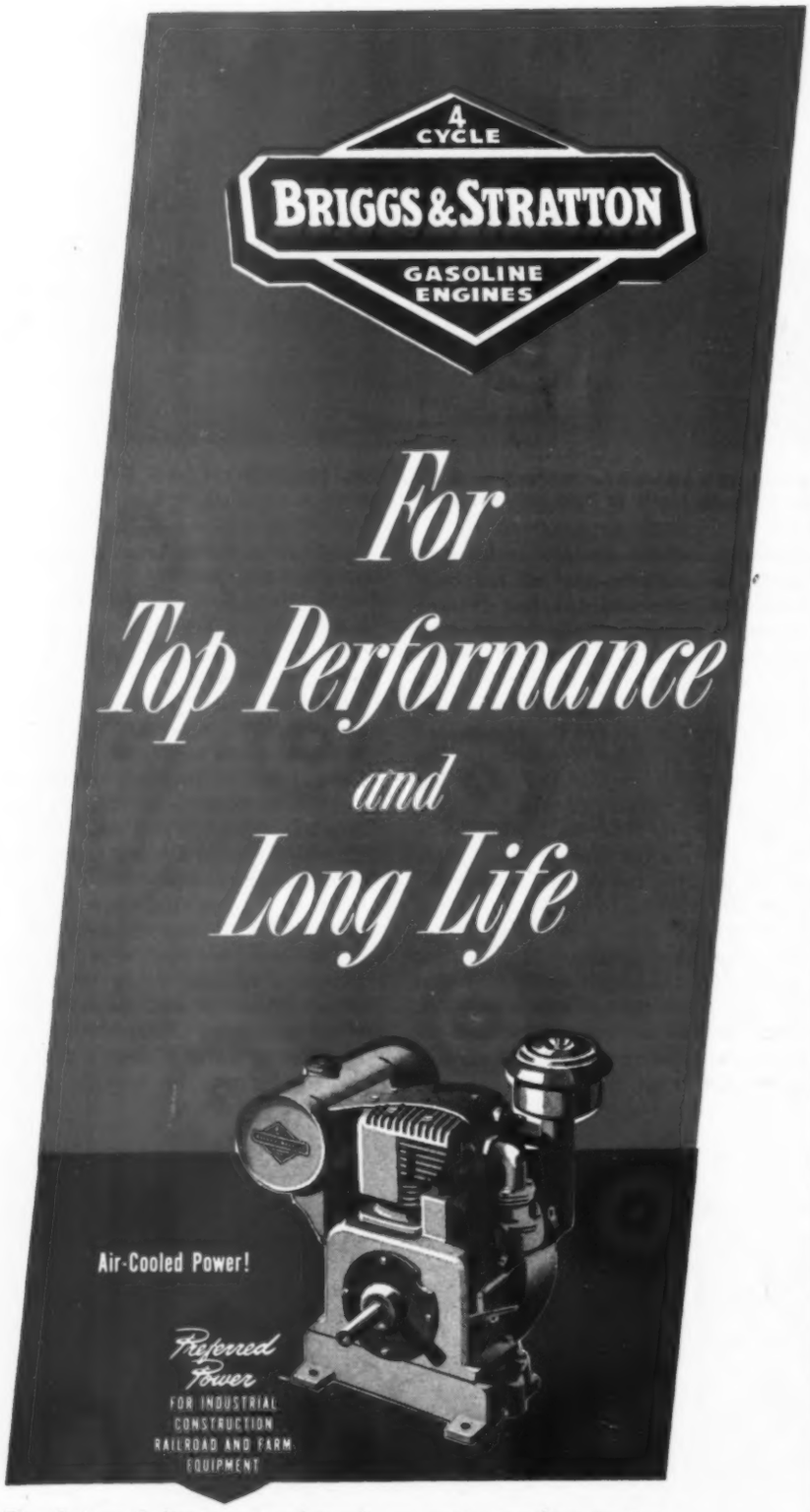
Concrete is mixed on the job by a standard paver mixer which supplies a 1-yd. crane bucket with hand dump. Adjustable wooden bulkheads set between the blocks of stone form pockets into which the concrete is dumped. After the mixture has set the bulk heads are removed for use farther along. A crane and the mixer work together pouring concrete after the other cranes have set the blocks. The basket-type sling chain used, with special grab hooks for the blocks, can be quickly removed from the crane hook, and the ring of the single-leg bridle sling chain of the concrete bucket thrown over the hook if it is desired to change cranes. In a matter of minutes the crane is converted from block lifting to concrete pouring.

Preformed wire rope is used for this important lifting. Mr. Bridges notes that the slight additional cost of such rope means actual savings. Crane booms are very active and the continual bending over small sheaves gives the ropes hard wear but preformed lasts so much longer. It's safer for workmen because it doesn't barb and cut them.

The Chicago Park District equipment used on this job consists of 2 Link-Belt, 2 Northwest and 1 Lorain cranes, a Koehring concrete paver, a Caterpillar D75 bulldozer, a 1½-ton Ford dump truck, and a pick-up. Thirty men are employed. The blocks are quarried in Bedford, Indiana, and shipped on flatcars to Chicago where they are unloaded and hauled two at a time on special 6-wheel trucks operated by an independent contractor. Delivery is completed when blocks are unloaded at the site of operation.

The last one-half mile of stone structure is now being erected between Diversey and Belmont Aves. When completed Chicago will have its 28 miles of Lake Michigan shore line protected from the ravages of high water and storms.

★ Sling chain with special grabs, speeds handling of 6-ton blocks. Bulldozer is used for backfilling and grading.



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The Weather In Prospect

By Halbert P. Gillette

THERE are numerous weather cycles whose lengths are less than 67 years, as indicated by the accompanying table. Partly because of their large number, but also because of other factors, it is not yet possible to forecast reliably as to weather a week or so ahead in regions subject to great changes. But this does not mean that the forecaster is helpless where the longer cycles are involved.

To begin with there are, I believe, no very important weather cycles of less than 67 years other than those in the accompanying table; but at times weather cycles of half these tabular lengths occur.

The first law of cycles is that the vast majority have lengths that form geometrical progression series whose ratio is three.

The second law is that cycles whose lengths are commensurable are harmonic; that is to say, the peak and valley of a long cycle in a given triplex series is also the peak and valley of every shorter cycle in the same series. Thus the 67-year and the 2.48 year cycles of Series A had a simultaneous rainfall maximum July 12, 1883, in regions where the opposite (a drought) did not occur. Hence July 12, 1950, a rainfall peak will occur again in many regions, and 2.48 years (practically 30 months) earlier there will be wet-cold weather, namely, in January, 1948, unless offset by some other cycle. Since no other cycle in the table will offset this effect, it is highly probable that next January will be abnormally snowy in northern regions.

The third law is that the amplitude of a short subcycle in a given series increases when its peak occurs near that of a long supercycle of that series. This makes it probable that it will be extremely snowy next January.

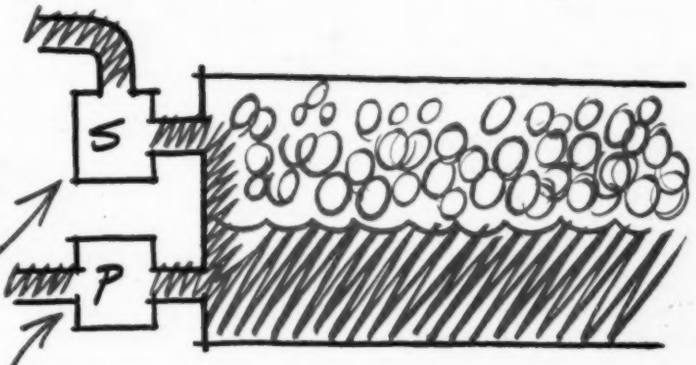
The fourth law is that exactly opposite conditions may occur in localities not far apart, when storm tracks are narrow and tend to repetition along a given track. Then what one locality gains in rainfall is at the expense of other localities. This condition is still very difficult to forecast, and tends to upset any forecast as to rainfall in a particular locality. But

(*Continued on page* 97)

LUBE MEMO

Air bubbles can wreck bearings

In our dry-sump system, air sucked through scavenging pump makes lube foam.



When foam gets into pressure pump, it loses suction, pumps insufficient oil to bearings...!!

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1. *Special compounds in RPM DELO Oil minimize bubbles.*
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Aviation Officials and Contractors Meet

NASAO-AGC Joint Committee Holds First Meeting, Asks Revision of Grant Procedure

THE JOINT Cooperative Committee of the National Association of State Aviation Officials and The Associated General Contractors of America, at its first meeting, asked the Civil Aeronautics Administration to revise current procedures in offering grants and awarding contracts for airport construction under the Federal Airport Act of 1946.

At this recent meeting, held in conjunction with the NASAO annual convention at Fort Worth, the committee also outlined its policies and purpose, and compiled a list of problems involved in carrying out the new 7-year airport program, which the committee will study in the future.

Co-chairmen of the committee are Dexter C. Martin, director, South Carolina Aeronautics Commission, Columbia, S. C.; and George C. Koss, vice president, Koss Construction Co., Des Moines, Iowa.

Resolution on Grant Offer

The action on grant offers and contract awards was taken for the purpose of eliminating delays between the time of receiving bids and the final award of contracts, which results from a rule whereby the amount of a grant offer cannot be increased.

Contractors pointed out that when the cost of a project as evidenced by bids, is higher than anticipated at the time the original grant offer was set, the alternatives have been either to reject bids or to put through another grant offer which involves long delays.

The committee's resolution follows: "Resolved that CAA publicize its consent to the following procedures:

(1) When the sponsor so desires, he may forward his project request, complete with all necessary documents including the plans and specifications, and obtain a grant offer on the basis of the estimated prices shown.

(2) Upon receipt of the grant offer, the sponsor may then advertise and receive bids for the construction work.

(3) Having revised his estimates of total cost on the basis of the bids received, the sponsor may request the CAA to amend the grant offer accordingly.

(4) CAA would then, within the limits of its financial ability, revise the grant offer for acceptance in the revised amount by the sponsor.

(5) In this connection, the regulations require the acceptance of the grant offer within 60 days of the time CAA sends it to the sponsor, and it follows, therefore, that the advertising and receipt of bids must be scheduled so that the CAA will have opportunity to send out a revised grant offer within the time allowed.

"THEY HAVEN'T RELAXED AN INSTANT SINCE YOU TOLD THEM TO BE CAREFUL OF THAT STUFF THE OTHER DAY."

Lack Engineering Plans

It was brought out at the meeting that one of the principal factors currently holding back the airport program is the lack of engineering plans and specifications.

Problems involved include persuading local public engineers to expedite airport plans in the face of other work for which they are responsible, and the time involved in educating private engineers engaged in this work. It was agreed, however, that the situation should improve in the future.

Among subjects offered by Mr. Koss for consideration of the committee were (1) the time in calendar or working days for completion of projects; (2) the frequency of financial statements required of contractors; (3) keeping specifications in line with local conditions with respect to materials, methods, etc., in order to encourage competition; (4) the merits of an over-all contract instead of separate contracts for various phases of a project; and (5) qualifications of contractors.

H. Arthur Hook, CAA Assistant Administrator for Airports, Washington, D. C., reviews the agency's policies on specifications, contracts, and bidding procedures.

Because federal funds are limited to participation in the cost of items named in the Federal Airport Act, bidding and accounting procedure must be set up to make possible segregation of those work items desired by the sponsor, but in which the CAA cannot share the cost, Mr. Hook said.

He also pointed out that sponsors have the option to specify whether working days or calendar days are to be used in time allowed for completion of contracts.

Mr. Hook said regional superintendents had been advised by CAA that use of its standard specifications is not mandatory.

Purpose of Committee

Harry J. Kirk, Washington, D. C., AGC co-secretary of the committee, outlined the purpose of the committee as "To study ways and means of

expediting the construction of needed airports so as to provide the maximum in airport facilities for the airport dollar.

"The construction of airports with federal aid is a new venture. There are many problems without precedent whose solution calls for understanding and cooperation, both on the part of the engineers and officials who administer the preparation of plans and the award of contracts, and the contractors who actually execute the construction of the airports."

The committee will confine its activities to an objective approach to airport construction problems, furnishing a means of bringing about mutual understanding and cooperation.

Two Meetings a Year

It was recommended that the committee meet at least twice annually, at annual conventions of the NASAO and the AGC; that CAA representation be requested at each meeting; and where feasible, other state aviation officials and contractors in the vicinity of the meeting location be invited.

Members representing the NASAO, besides Mr. Martin were: Dabney R. Yarbrough, Jr., supervisor of planning, S. Carolina Aeronautics Commission, and chairman of the association's Engineering Committee; Norman C. Bird, chief engineer, Illinois Department of Aeronautics, Springfield; Wesley E. Keller, president, Committee on Aeronautics, N. Dakota Public Service Commission, Bismarck; A. W. Meadows, director, Texas Aeronautics Commission, Austin; John W. Meyers, chief engineer, Louisiana Department of Public Works, Aeronautical Division, Baton Rouge; George W. Pride, airport engineer, West Virginia Board of Aeronautics, Charleston; and R. T. Weller, state airport engineer, Nebraska Department of Aeronautics, Lincoln.

Representing the AGC in addition to Mr. Koss and Mr. Kirk were Gayle Armstrong, manager, Armstrong & Armstrong, Roswell, N. M., and chairman of the AGC Airway Facilities Committee; R. B. Dunbar, manager, Fort Worth Chapter, AGC; Max C. Harrison, Harrison Construction Co., Pittsburgh, Pa., G. W. James, T. L. James & Co., Inc., Ruston, La.; and Glenn McDonald, manager, Association of Oklahoma General Contractors, AGC.

Sealing and Dust Laying

(*Continued from page* 70)

this measure is its reasonable cost. The oil used is so-called "Bunker C" manufactured for ships at sea and is similar to heavy crude road oil. It costs currently 7 cents a gallon. About .4 to .5 gal. per sq. yd. is applied, and the property owners pay only for the oil. Numerous property owners who cannot afford more costly street improvements have thus gained relief from dust, and at the same time the city has taken a step that often "holds" a street for a year with little or no maintenance.

The city bears the relatively small expense of blading and reshaping, furnishing of a small gravity distributor, labor of application, and a light cover of No. 7 or No. 8 slag chips.

About 180,000 gal. of oil was used during the 1947 work. A 10,000-gal. storage tank (capacity of one tank car) was employed by the city to insure continuous availability. Oil is applied only between May 15 and Sept. 15.

Dust laying by this means is not pushed or advertised in any way. It is its own best advertising. Property owners who get the idea from seeing the work in progress on adjoining streets must petition for the oiling service and put up the money for the oil with the city in advance.

L. D. Merrill, superintendent of streets and garbage, has charge of the foregoing types of activities in Birmingham, under the direction of J. W. Morgan, commissioner of public improvements.

The Weather in Prospect

(*Continued from page* 94)

when the forecast relates to a region (e. g. Illinois) there is less risk of failure in forecasting, because storm tracks usually tend to shift frequently and considerably. This is notably true as to winter storms.

There are other causes of opposite phases of weather in different regions; e. g., due to the existence of some intense stationary anticyclone, or high barometric pressure area, that covers a large region. When thus blanketed by descending dry air, such a region has a prolonged drought near the rainfall peak of a long cycle in another region controlled by a great stationary cyclone. Of course this is contingent on there being no long cycle that has a valley about the same time. Blanketing with dry air is apt to exist in the summer in certain parts of temperate zones. Hence, it often happens that a summer drought in such a region is followed by a very wet winter. Like opposition between summer and winter rainfall, there tends to exist opposition between fall and spring rainfall.

The fifth law is that the greater the length between similar phases of a cycle (i. e., the lengths given in the table), *the longer do its very wet and very dry periods last.* Thus, either very rainy or very dry weather tends to exist on the average for about 6 years before and 6 years after a peak of the 67-year cycle. But since that cycle has subcycles, they cause oscillations in the rainfall that tend to be more extreme as the peak of the cycle approaches.

A booklet on Cycles and Their Causes will be printed in January, a copy of which will be sent on request. Address Gillette Publishing Co., 22 West Maple St., Chicago 10, Illinois.

SIX TRIPLEX SERIES OF CYCLES

Series	Lengths of Cycles in Years						Peak July 12
A	67.00	22.33	7.44	2.48	0.83	0.27	1883
B	63.00	21.00	7.00	2.33	0.78	0.26	1872
C	59.00	19.67	6.56	2.19	0.73	0.24	1876
D	55.00	18.33	6.11	2.04	0.68	0.23	1881
E	51.00	17.00	5.67	1.89	0.63	0.21	1871
F	47.00	15.67	5.22	1.74	0.58	0.19	1902

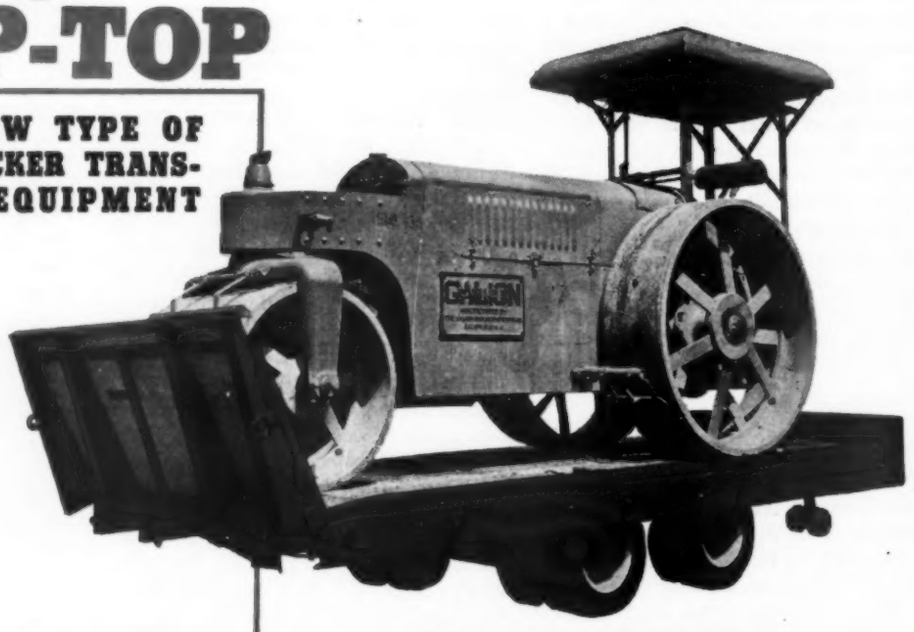
Footnote: The length of each cycle in each of these 6 triplex series is exactly three times that of the next shorter one. Cycles of half these lengths exist in sunspot numbers, and sometimes in rainfall, but in rainfall the tabular lengths are more common. Cycles whose lengths are given in the same column differ in amplitude (departure from a mean), those of Series A having the greatest amplitude. The lengths of cycles in each column are an arithmetical progression series.

•

New York—Use of reflectorizing materials in traffic stripes on state arterial routes is being tested on a wide scale. The first experimental installation was made on Long Island two years ago. It still retains a high degree of reflectivity, according to d. of p.w. report. The Albany-Rensselaer bridge approach with one of the highest traffic concentrations on the state system was selected recently. And in the Buffalo area experimental use of paints from several manufacturers is being made.

Introducing TIP-TOP

AN ENTIRELY NEW TYPE OF TRAILER FOR QUICKER TRANSPORTATION OF EQUIPMENT



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Sturdily constructed with pressed steel frames, TIP-TOP Trailers are available in 7-ton capacity (single axle) or 12-ton capacity (tandem axle) and provide a liberal factor of safety for unavoidable overloads. Also, where desired, special capacity sizes can be made to specifications.

TIP-TOP Trailers are equipped with approved lights and reflectors, vacuum, air or electric brakes and comply with all state laws.

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TIP-TOP TRAILERS MAKE LOADING and UNLOADING AS SIMPLE AS THIS!

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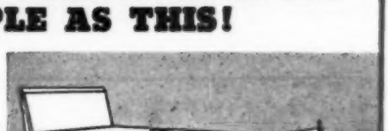
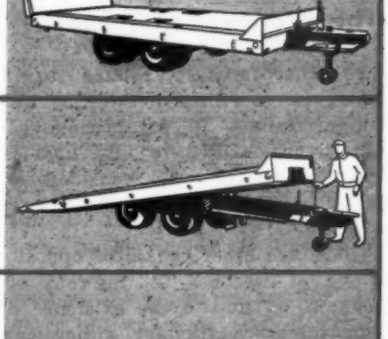


2. Tail skid is lowered and loading platform is raised by hydraulically controlled, hand operated pump.



3. Equipment is driven on under its own power with tail skid serving as ramp. Release valve is then opened so that loading platform will return to its original position and automatically lock. The tail skid is then hydraulically raised to shorten overall vehicle length and to serve as barrier for load. In unloading, same procedure is followed and equipment is driven off under its own power.

TIP-TOP TRAILERS

Patent Pending

For additional information on TIP-TOP Trailers, write for folder R.

National Highway System for Turkey

Eight engineers of the Public Roads Administration left New York on Nov. 29 to aid the government of Turkey in planning and constructing a national system of modern highways. Four more engineers left on Dec. 19 to join the first group. The mission is headed by H. E. Hilts, Deputy Commissioner of the Public Roads Administration, who will stay in Turkey through the preliminary stages of the work. Jesse E. Williams has been appointed to head the office being established at Ankara as division engineer.

The purpose of the mission is to assist the Turkish government in launching a long-range program of highway construction that will result eventually in a system of all-weather highways reaching to all parts of the country.

American aid is to be financed by $5,000,000 assigned by the Department of State from the Turkish Aid Fund. This will be used largely for machinery and equipment and to meet the expenses of the mission. Already equipment valued at about $750,000 has been obtained from the Army and is being shipped to Turkey. Costs of right-of-way, materials, labor and detailed supervision are to be met by the Turkish government.

Immediately objectives will be to plan and begin rehabilitation of the most urgently needed roads and at the same time train Turkish citizens in all branches of highway work from skilled laborer to highway engineer. A small group of competent mechanics, machine operators and supervisors will be sent to Turkey as instructors to develop skilled highway construction and maintenance working forces. Construction jobs will be manned completely by Turkish nationals.

The highway organization within the Turkish Ministry of Public Works is to be expanded and will cooperate with the division engineer of the Public Roads Administration in planning programs and carrying on construction. All steps taken must be mutually satisfactory to the agencies of the two governments.

Strengthening Bridges with Added Beams and Grid Floor

SO many thousands of small bridges need strengthening or replacement that some have to wait years before highway departments can get around to them. Any trick that will bolster them up temporarily is worth a try.

One obvious way to raise the safe load limit on some of these structures is to respace the floor beams and make room for a couple of new ones. The Pennsylvania department of highways has employed this procedure lately. Usually the maintenance men have found that the addition of two more beams and a steel grid floor will bring a bridge up to standard H-20 loading on secondary roads. The chore also, of course, includes a careful inspection of the existing beams, and replacement of any that look too moth eaten.

Run Guard Rail Across

Another idea that is helping the forces get by in Pennsylvania is the one of not replacing or repairing old disintegrated parapets on small bridges, but just running the cable guard fence continuously across the bridge in lieu of a structural rail of any kind. Sometimes when this is done the motorist hardly knows there is a bridge.

Calcium Chloride Technicians Meet

With technical representatives of all four member companies attending, the Calcium Chloride Association recently held a 3-day conference in Uniontown, Penn.

The meeting which was under the supervision of G. H. Kimber, Managing-Director of the Association, included a speech by E. W. Geary, Columbia Cement Division, Pittsburgh Plate Glass Co. on the use of calcium chloride as an admixture in concrete.

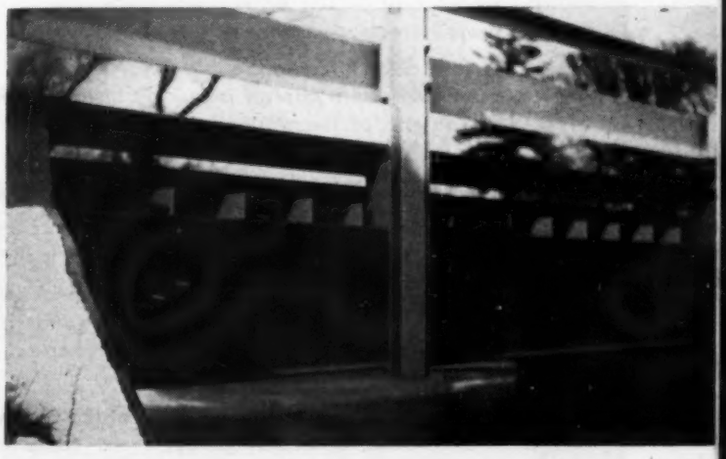
Also of great interest to the visiting engineers was a report on the use of calcium chloride in road soils. A discussion of extensive research carried on at Purdue University was given by Elden J. Yoder who conducted the work.

Engineers from the Dow Chemical Co., Wyandotte Chemicals Corp., Solvay Sales Corp., and the Columbia Chemical Division of Pittsburgh Plate Glass Co., reviewed the research in highway engineering and coal fields that has been carried on during the past few months by the Association.

Meetings were also held to discuss past accomplishments and future plans in such calcium chloride use markets as bases, frost, ice control, surface consolidation, concrete, and coal.

Asphalt Institute Issues New "Specs"

The Asphalt Institute has issued a new edition of its Construction Specifications. Embodying revisions and addition, this edition replaces previous editions. It is available on request to engineers and officials concerned with design, when request is made on engineering or official letterhead. Please write nearest office of the Institute.



★ Illustrating type of reconstruction found economical on Pennsylvania small bridges

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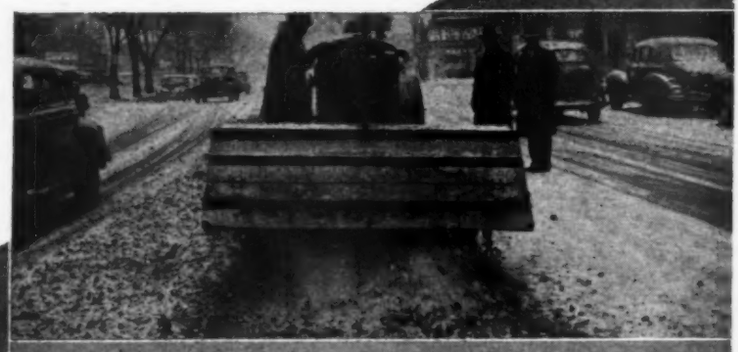
An All Year UNIT!

INTERCHANGEABLE ROTOR FOR ICE REMOVAL FROM HIGHWAYS AND RUNWAYS!



Many contractors who have made highly profitable use of the SEAMAN MIXER through the road construction season, — add to their profits during the winter months by converting the SEAMAN for use in the removal of ice and frozen drifts from highways, streets and runways.

A low cost, interchangeable rotor equipped with special tines and depth control is quickly installed. Re-conversion at the end of the winter back to a mixing unit is equally simple.

The SEAMAN is recommended specifically for

1. The shattering of ice up to as much as 3" in thickness on paved surfaces to facilitate removal.
2. When fragmentation is impossible due to certain conditions of ice, — to grind the ice surface down to rut-base level in order to remove dangerous ruts and irregularities.
3. To roughen the surface of slippery areas when time does not permit more complete treatment. This in turn also greatly increases the efficiency of sand or other material which may be subsequently applied.
4. To penetrate and pulverize hard, frozen snow drifts which are damaging or impossible to handle with conventional snow removal equipment.
5. To pulverize rough, compacted snow on airfields to permit mechanical re-compaction for hard, level runways, — or to facilitate leveling by blade or plow.

The handling of ice as well as many other profitable applications are described in detail in the book "Soil Stabilization Methods" compiled by SEAMAN engineers. Ask for Bulletin RS-25.

SEAMAN MOTORS, INC.
MILWAUKEE 3, WISCONSIN

Saving $$ with Metallizing

Each year many thousands of dollars are wasted in the construction field alone in the form of worn parts that could have been repaired but were replaced instead. Many contractors rejuvenate worn equipment by weld buildup; but welding, while efficient in a multitude of applications, is not the answer for precision machined parts.

The material in this article was taken from "Metallizing Process and Equipment Catalog," published by Metallizing Company of America, 1330 West Congress Street, Chicago 7, Ill.

METAL spraying, the process of building up worn parts with a fine spray of molten similar or dissimilar metal, is saving industry in general incalculable dollars by reclaiming numerous machined parts that a few years ago would have been impossible to repair. War-fostered improvements in spraying techniques have broadened the scope of metal spraying to the point that its present applications are virtually unlimited, and the end is by no means in sight. Each year new applications are found, new techniques are discovered, and metal-spraying acceptance spreads out in an ever-widening circle.

Shafts Cost $ $

Crank shafts, for instance, are an expensive bit of machined perfection. The stresses and strains to which they are subjected create extensive wear, lead to early crank shaft death. For the fraction of the cost of a new one, virtually any worn unfractured crank shaft can be built up with an oversize layer of tightly bonded sprayed metal and machined back to correct size.

Cracked cylinder heads can be grooved out, studded with small studs, sand or grit blasted, then sprayed to the necessary height with Swedes iron. Fuel pump rotor shafts have been repaired; rear wheel hubs, axle sleeves, bearing races, clutch shifter shafts, oil sleeve yokes on universal joints, and other parts.

In truck maintenance metal spraying is relied upon for repairs of damage, which, if not repairable by this method, would today more than ever before knock thousands of needed vehicles out of service.

Through metal spraying, the rebuilding of truck, shovel or scraper parts has become commonplace. Worn journals and crank pins are brought back to standard size so that standard bearing replacement can be used if new bearings are found necessary. In addition, laboratory tests have shown that a metal-sprayed surface is in every way superior to the base material coated, due to the greater surface hardness of the coating and to its oil-retention characteristics, which provide a lubrication reserve in case of failure of the lubricating system.

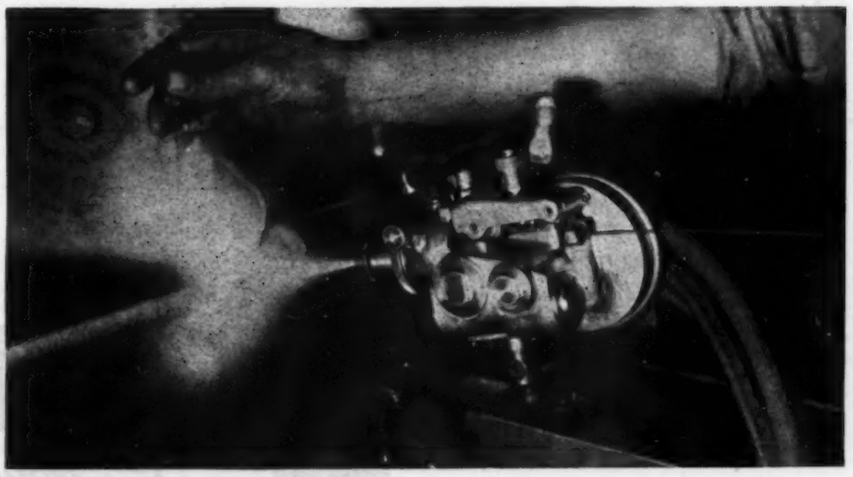
Axle Rebuilding

Another application of metal spraying is in the repair of axle shafts, axle housings and hubs, when ball or roller bearings become loose on the shafts or inside the bores of the housings or hubs. As a rule, only a slight build-up is required and it is seldom necessary to finish the coating in any manner, as a skilled operator can gauge the thickness of the coating accurately enough so that the bearing can be press fitted on the shaft or in the recess for the outer ring. Such repairs are speedily and inexpensively made and represent a tremendous saving.

Cracks which develop in the combustion chamber area of motors can often be filled at an extremely small cost compared to the replacement price of a new head or cylinder block. These cracks may show up in the head proper, between the valve seats or between the barrel and valve seats. Leaks in water jackets can be stopped by metal spraying the cracks, and in many cases it is unnecessary to remove the motor from the chassis. If the area to be coated is at all accessible, the repair can be made in a few minutes.

In addition to repairing an unlimited number of parts, metal spraying is extremely efficient in the protection of metal surfaces and machines which are exposed to the corrosive action of water, air or various chemicals. Metal spraying has been found to be equal, if not superior, to paint and other treatments in varied conditions.

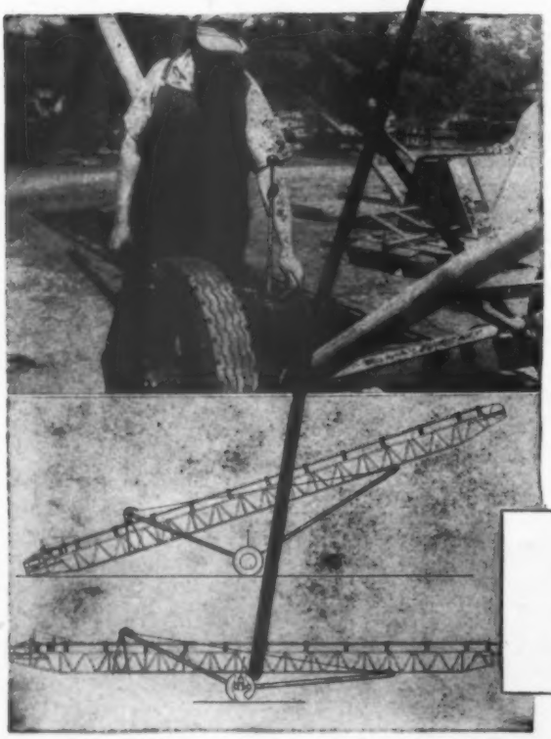
The electrical department of a large California city had a serious



★ Worn shaft reclaimed by metallizing

Up again down again...

In less than 10 Minutes!



Moving conveyors from one job to the next used to take hours of valuable time, good men and equipment.

Now, it's a matter of minutes. One man can easily elevate a 60′ conveyor in 9 minutes with the new *Pioneer* Hydraulic Conveyor Truck. A twist of a valve, and in 60 seconds the conveyor is back in its cradle . . . ready for another move.

Low overheads are no problem for this smooth rolling truck for it's *built without masts* and requires only 7′3″ clearance.

The *Pioneer* Hydraulic Conveyor Truck handles conveyors up to 60′ in length with belts up to 30″ wide. Write for complete details today.

PIONEER ENGINEERING WORKS, INC.
1515 CENTRAL AVE. • MINNEAPOLIS 13, MINNESOTA

●A sturdy Blackhawk Pump boosts the conveyor into exact feeding position. Once spotted, it's locked securely in place. A low center of gravity, 8′ tread, and pneumatic tires add to portability.

BUY BOTH—
Higher Output, Lower Upkeep!

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Continuflo EQUIPMENT

★A gas holder being sprayed with zinc to protect surface from salt air of the west coast

Mogul Metallizing Drum Shaft

★This photograph was taken at the National Bushing and Parts Co., Minneapolis, Minn. The power shovel drum shaft illustrated was built up 1/8 in. with .25 carbon steel by Mogul Metallizing for its entire length of 8 ft. The other drum shaft and several gears which can be seen on the floor were also sprayed. The gears were built up 1/8 in. with .25 carbon steel on the internal hub area. The photograph also shows the excellent ventilating system devised by National Bushing. The larger duct (upper left) pulls the air from the blast room and also from the smaller lathe which is opposite the one in the photograph

problem in the protection of its underground transformers. Every type of paint was tried, without lasting results. Finally the transformers were sprayed with zinc, which with one application has met all requirements. Steel highway and railroad bridges, anchors, barge hulls, battery chamber walls, floors of submarines and water pump housings, exposed more or less directly to mositure corrosion, are other units which metal spraying has protected with a minimum of cost.

Metal sprayed zinc can also be used to protect tubular railing standards, sluice gates, steel stairways, steel doors, architectural metal work, tubular radiators, gasoline and Diesel oil tanks, mixers, floats for hydraulic power schemes, weigh bridges, felt rolls, chains for pulley blocks, flexible pipe, searchlight casings, brush springs for generators and motors, etc.

3 Basic Steps

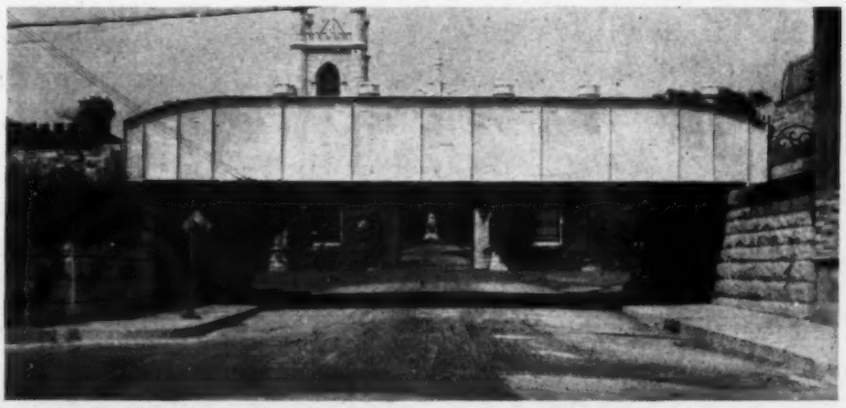
In general, the repair or protection of a part or surface consists of three steps: surface preparation, application of the coating and finishing of the sprayed surface, if necessary.

Both metallic and non-metallic surfaces need a preliminary preparation before spraying. The purpose of this preparation is to thoroughly clean the surface and roughen it sufficiently so that the coating will adhere as it is sprayed on.

On large flat areas or irregular surfaces, a thorough sand or grit blasting will give the desired results. A sharp abrasive should be used. On shafts or similar cylindrical members preparation is accomplished by either rough threading, or by heavy blasting with coarse angular steel grit. Either method roughens up the surface in such a manner that innumerable pores and crevices are created, into which the sprayed metal locks itself securely. Surfaces which are naturally porous, such as cement, plaster, wood, etc., require no preliminary preparation if they are clean and free from paint, lacquer or other sealers.

The next step in the metal spraying process is the application of the coating by means of a metal spraying "gun." This is a device consisting of a power unit and a combustion unit united as an assembly. Wire (of the metal desired as a coating) is fed into the combustion chamber where it is reduced to a molton state. It is forced through a nozzle at high velocity by air pressure. As the minute particles of molten metal strike the prepared surface, they are driven into any crevice that may be in their line of flight, forming thus a strong, coherent coating of sprayed metal. As metal spraying is a continuous process the coating can be built up to any predetermined thickness.

The last stage is the finishing. To



★Railroad bridge metallized with zinc to protect it from corrosion

WITH

HARD-BITING

DRAGSHOVELS

Sewer trenches and basement excavations yield profits with the Bucyrus-Erie 10-B, 15-B and 22-B dragshovels. Fast and effective, they combine a quick hoist and swing with a powerful digging stroke that fills the dipper at every pass, for a rapid overall cycle that eats up work and boosts output.

The dragshovel dipper, too, adds to efficiency. With a long extended dipper lip that penetrates easily and supplements the relatively long side cutters to hold extra material, it has a high arch that permits easy filling without voids. The 10-B dipper is all-welded, shaped for fast penetration, accurate digging and quick dumping. Arch and lip of 15-B and 22-B dippers are of a single, heat-treated casting, while the rest of the dipper is of streamlined, all-welded construction matching great strength with a front-to-rear taper for fast dumping and clearance in wide trench work.

Dragshovel efficiency is only one of the features which have made the Bucyrus-Erie 10-B, 15-B and 22-B excavators world famous. With *any* front end equipment they are fast, profitable performers. It will pay you to see your Bucyrus-Erie distributor for more information.

BUCYRUS ERIE — SOUTH MILWAUKEE • WISCONSIN

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what extent that is necessary depends entirely on the purpose of the coating. Protective coatings that are sprayed on as a resistant against corrosion are rarely finished in any manner. Coatings that will be used for decorative purposes may be ground, polished or given a chemical treatment to change their color. In finishing machine elements, it will depend on the nature of the spray as to whether the coating can be tooled or will require grinding. Practically all the metals except the higher carbon steels can be machined without difficulty. For high-carbon steel, grinding will be necessary to achieve a satisfactory finish.

Why toss valuable parts on the junk heap if they can be repaired with a saving of the dollars in your pocket?

Maintenance of

Diesel Nozzles

Condensed from Bulletin No. 1330, Published by The Buda Company

OF PARAMOUNT interest to the owner or operator of a diesel engine is proper maintenance of the fuel injection system. The parts that should receive the most frequent checking and servicing are probably the most neglected, that is, the nozzles or injectors.

The fuel injection system of a diesel engine performs essentially the same functions as the carburetion and ignition systems of a gasoline motor. Diesel fuel systems are subject to similar deterioration of efficiency and can cause power loss if not kept in perfect condition.

There is no questioning of the fact that diesel engines are superb in their general performance and fuel economy, but no machine is perfect. The heart of a diesel is the injection system; the injector or nozzle is subjected to the most gruelling punishment during every minute of operation and they must be given a regular inspection to make sure that the "beating" they take has not impaired their efficiency.

Injectors should be tested for three things:: (1) injection pressure, which must be within certain limits for effective operation; (2) opening and closing of valves without leakoff or dribble; and (3) spray pattern.

Ounce of Prevention

Much can be done to prevent nozzle trouble. Prevention is still a lot better than cure.

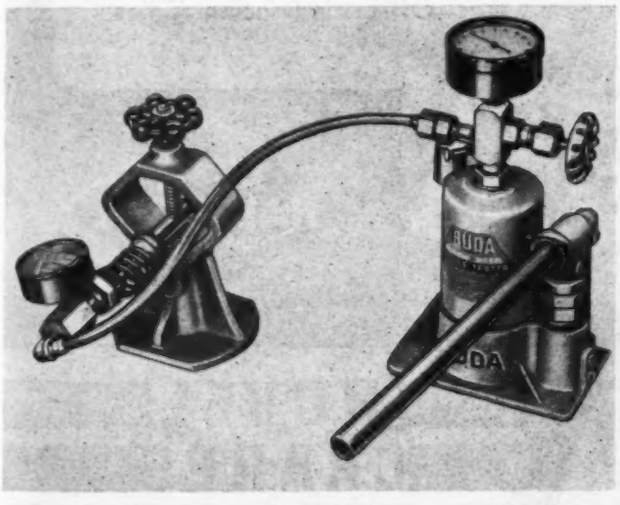
The principal causes of nozzle trouble are dirt, heat and water. In open nozzles, with no spring-loaded valve, erosion and clogging are the main troubles. Erosion, caused by water or fuel acids, causes the metal to deteriorate and slough away at the orifices.

The enlargement of these openings, by the smallest degree, increases fuel consumption and seriously affects the running of the engine. Clogging, caused by dirt and other foreign bodies, has the opposite effect. Here the spray pattern is affected and the engine receives only a part of its fuel needs.

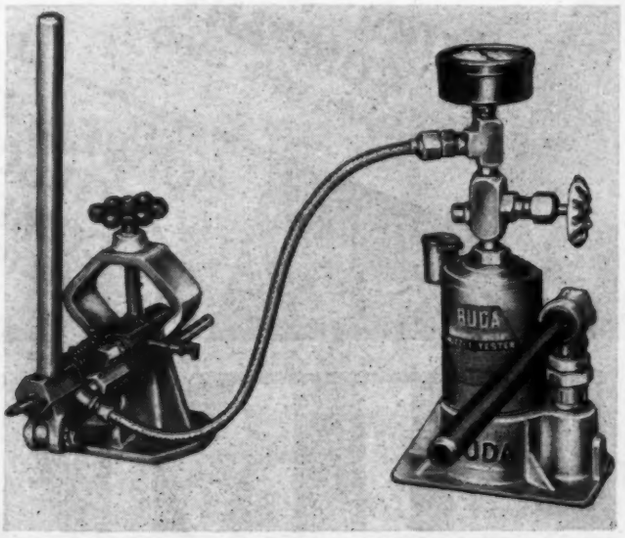
With closed or spring-loaded valve nozzles, the effects of erosion and clogging are still more serious. The valve needle may stick in the guide. Injector valve stems and pump plungers can become eroded and scored. These parts are fitted with extremely close clearances and the smallest particle of dust can stick or scratch them.

The smallest dust grain can hold open a valve enough to cause dribble or distorted spray. This causes incomplete atomization with resultant incomplete, smoky combustion of fuel and deposition of carbon around the nozzle openings.

Improper valve opening pressure is one of the most common causes of faulty operation. Poorly cooled nozzles or injectors and engine overloading are other causes of trouble. Mechanical faults, such as parts breakage, are one of the rarest forms of trouble.



★ Testing Cummings Fuel inlet tube



★ The GMC 71 series hook-up

Announcement

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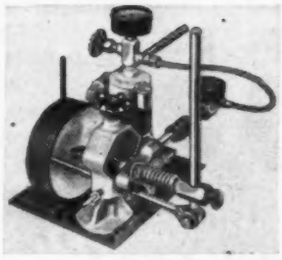
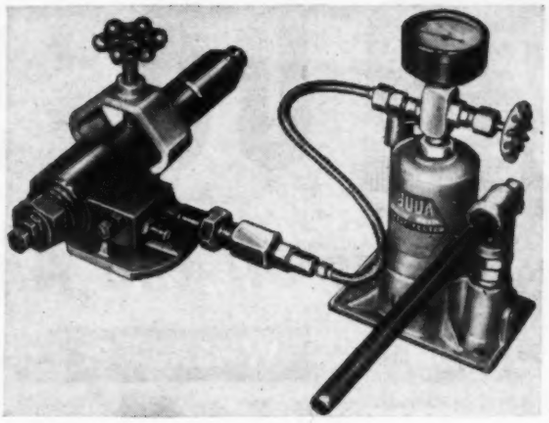


★ Tester and cradle mounted on portable base



★ Showing hook-up for testing heavy standard nozzle

Improper or dirty fuel as well as heat contribute to a large percentage of nozzle failure. Diesel engine designs have advanced to the point that no trouble will be experienced with heat unless an engine is abused or overloaded.

The use of good fuel; clean fuel, is up to the owner. If you buy your fuels from recognized dealers and use the type specified by the manufacturer, you are going to eliminate a lot of nozzle trouble.

What to Look For

It is comparatively easy to locate a defective nozzle. Watch for:

(1) Engine smoking when there is no overload.

(2) Loss of engine power.

(3) Uneven engine operation.

(4) Unusually high or low exhaust temperature readings.

(5) Combustion knocks in one or more cylinders.

Some injectors have a small pin that is in contact with the valve needle. If a finger is placed against this pin while the engine is running a sharp kick can be felt if the nozzle is working. If there is no feeler pin, the line may be shortened out by opening the bleeder valve or fuel line connections. If this is done and there is no drop in power, the nozzle is defective.

It is also comparatively simple to diagnose trouble in a defective nozzle. It generally falls into one of the following categories: (1) incorrect spring tension; (2) defective valve seating; (3) stuck valve stem; (4) eroded valve stem; (5) defective orifice; (6) clogged or carbonized tips; and (7) broken or otherwise damaged valve parts.

(1) If the valve-opening is too high, reduce the spring tension; if too low, increase it.

(2) Defective valve seating is indicated by leakage and dripping from the orifice at a pressure below the normal valve-opening pressure. The cause may be dirt on the valve seat or a damaged valve or seat. The trouble can usually be located by a strong magnifying glass.

(3) If the needle is stuck, the nozzle action will not be sensitive to the pressure of the spring. The needle should be examined for free motion in the guide. If the needle is tight or cannot be moved with the fingers both needle and guide must be replaced if the condition cannot be corrected.

(4) An eroded valve stem can be detected by bringing the pressure up to just short of nozzle opening and allowing it to set at that pressure. If a rapid loss of pressure occurs, it signifies leakage along the valve stem. This is not always so, but if testing is done in a quiet place, it should be possible to hear a hissing sound as the fuel escapes.

(5) Defective orifices may be detected with a magnifying glass. If holes are not circular, the edges burred or ragged, or the pintle nonconcentric, the spray will be unsatisfactory.

(6) Carbonization of the nozzle tip and hard deposits formed on exposed surfaces originate from incorrect fuels or overheated nozzles. Nozzle orifices may also be eroded as a result of salt water contamination of fuels.

(7) When broken parts are encountered, be guided by the manufacturer's advice on nozzle repairs.

(8) Use only soft wooden tools in cleaning. NEVER USE ANY STEEL OR ABRASIVE TOOL OR SUBSTANCE SUCH AS SAND OR EMERY ON ANY SURFACE OF THE INJECTOR OR NOZZLE.

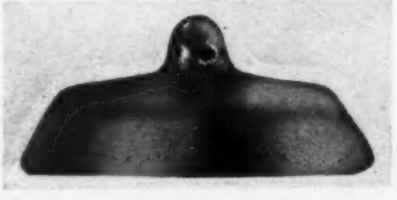
Operating Rules

Certain rules apply to the handling, cleaning and testing of any injector, regardless of make. Observance of these rules will result in longer injector life; less maintenance or replacement dollars out of your pocket.

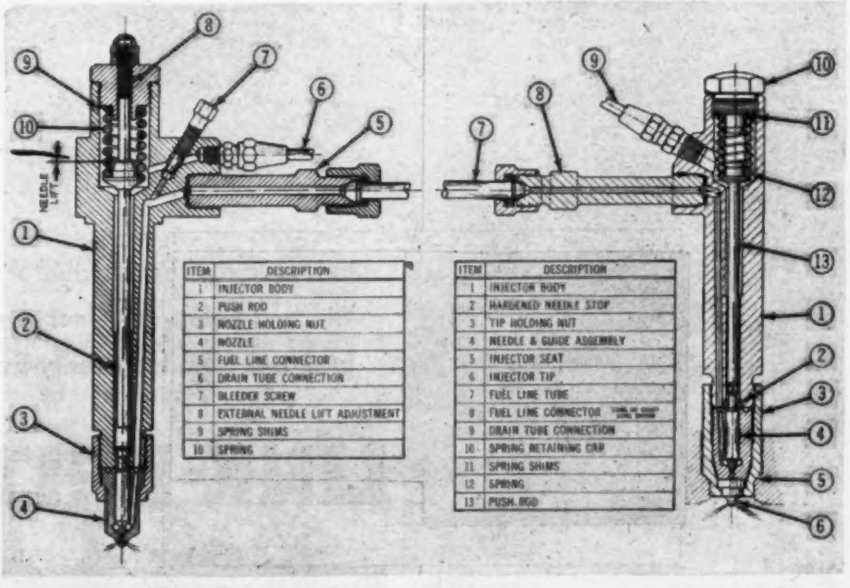
(1) Thoroughly clean and wash fuel lines and all exposed portions of the injector as well as surrounding surfaces of the engine before making any attempt to remove injector from engine.

(2) Follow directions in your engine maintenance manual when removing injectors or nozzle holders. Avoid striking assembly against anything.

(3) After removal, immerse injec-



★ A corroded and burned nozzle tip



★ Details of typical nozzle and holder types (Adeco)

The LINK-BELT SPEEDER UC-55

"Has all the Answers!"—

WHAT do you want to do with it? The Link-Belt Speeder UC-55 serves equally well as shovel-crane, clamshell, pile driver or .rench-hoe.

WHERE--? Anywhere, on roads or off roads. The big double-tired wheel-mounted UC-55 is not stopped by ground conditions.

WHEN--? It's ready to go on short notice, and doesn't take long to get there.

AND HOW! Watch it travel, watch it operate and you'll see why contractors, highway departments and municipalities use and praise the UC-55 for its efficient performance.

Let your nearby distributor show you the Link-Belt Speeder line and help you select the correct type and size for your purposes from the twenty-five models, 3/8 to 3 yard capacity.

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LINK-BELT SPEEDER

LINK-BELT SPEEDER CORPORATION, CEDAR RAPIDS IOWA

Builders of the Most Complete Line of SHOVELS-CRANES-DRAGLINES

tor in clean kerosene or fuel oil. Clean all exposed surfaces thoroughly. After cleaning, rinse thoroughly in fuel oil.

(4) Use only clean, lint-free cloths in wiping off parts.

(5) Use only soft wooden tools in cleaning. This is extremely important.

(6) If carbon solvents are used, do not allow any solvent to get into the interior of the injector. DO NOT IMMERSE IN SOLVENT.

(7) If the engine maker supplies drills or wire to clean nozzle orifices, use them exactly as directed. Make no attempt to substitute items of your own choosing. The enlargement of a nozzle hole by the smallest fraction of an inch may seriously affect the performance of an engine.

(8) Place injectors, or any parts removed, on clean paper and rinse well in fuel oil before replacing.

(9) Be sure that you have the right tester adaptor before starting to attach it.

(10) Use only the best of clean, filtered oil in testing.

(11) Keep the tester reservoir filled at all times while testing.

(12) Aside from testing spray pattern, and cleaning nozzle orifices, do not make any attempt to repair or adjust an injector unless the directions for so doing appear in the engine manual.

(13) Keep your hands AWAY from the nozzle spray. Pressure is sufficient to penetrate the skin and may cause BLOOD POISONING.

(14) Spare injectors should be cleaned, adjusted and wrapped in waxed paper before storing.

(15) Protect the tester from dirt and dust. Keep fuel cup closed and replace stud protector cap or cork when tester is not in use. Clean adaptors and accessories and oil them before replacing in kit.

●

Wisconsin—The state highway commission has been challenged by world-famous architect Frank Lloyd Wright, for its proposed design for a $1,000,000 bridge across the Wisconsin River near Spring Valley, the architect's home town. He characterized it "an outrage to the landscape." According to a news dispatch quoting commission chairman James Law, a design contract has been signed with a Minneapolis engineering firm. This architect is noted for his fierce criticism and his bold and radical design ideas.

Sheave With Demountable Rim

Cuts Replacement Cost and Increases Wire Rope Life

A timely, money-saving and production-boosting suggestion by Frank Heffernan, General Superintendent with one of Henry J. Kaiser's interests.

OURS is the only straight-line gravel plant in the United States. Our aggregate comes from a natural glacier deposit. We use three draglines (one a standby) in the pit, with a straight line conveyor with a 24-in. belt.

Because of the tide condition we must have a fast loading operation. All of our delivery is loaded onto boats and barges which come to us through the narrows of the Sound on a fast moving tide. These must be loaded in 'jig' time so that the boat or barge can return on the ebb tide.

Our three draglines, with 2½-yd. buckets, operated with 75 hp. electric motors, have 750 ft. of main line (IPS hemp center, 1-in. preformed wire rope). The haul back lines are 1,600 ft., ⅝th in., hemp center preformed.

Twenty feet out from the drum we use a 14-in. sheave. The main line traveling over this sheave groove acts as a fine grinding emery. With the conventional sheave we were forced to repair and build up grooves or replace sheaves at least once a month. The main line, even when we used the longer lasting preformed, gave us but about half the life which we should have received. Added to this extra rope and sheave replacement expense was the loss from shutdowns.

It was this experience which lead us to perfect a sheave with a demountable rim and groove which can be replaced in 5 minutes' time.

We took a conventional 14-in. sheave. Cut off the groove and put on a demountable rim (going back to the horse and buggy days). With six ½-in. bolts and lock washers on centers, the groove of the sheave can easily be changed without replacing the entire sheave.

To correct the condition of heavy wear due to the action of the sand on the rope through the groove, we had the groove cast from medium hardness manganese. We made a pattern here at our own shop and had the grooves and rims poured at a local metal smiths.

The demountable rim and groove costs us now $9. This is against a $45 replacement cost on a new sheave. However, the most appreciated savings come through longer rope life. With the conventional type of sheave and groove, our records show that we were forced to retire the main line rope each 60 days of operation. With the new sheave, ropes have been averaging 140 days life.

Also, because we are using only preformed wire rope, we gain a second use from our retired ropes. Because on preformed rope, surface wire breaks do not flare they give us a safe utility rope which can be handled by workmen without danger of hand injuries.

We have used the demountable rim type sheave grooves of medium hardness manganese now for 3½ years. In no case has a groove replacement required more than 5 minutes' shutdown. We are getting ten times the groove life which we formerly received.

★ Supt. Heffernan and his demountable rim sheave

New Construction Equipment and Materials

1

New Electric Plant

A new 500 watt electric plant, added to the line of Universal Motor Co., Oshkosh, Wis., requires only 2 cu. ft. of space. It is offered in two portable types to meet a larger range of requirements. Total weight is below 80 lb. for easy handling. Both are powered by a single cylinder, air-cooled gasoline engine of 1½ H.P. Each model provides 500-550 watts. Universal Model 550ES is a combination unit

Model 550-ES Lighting Plant

capable of charging 6 volt batteries while providing a direct circuit at 110 volts AC. It is electric starting, the engine being cranked by the generator from power supplied by the battery. Model 550B is for manual starting and is without the battery charging feature.

2

New Electrode

A new electrode, "Hobart Softcast A," announced by The Hobart Brothers Co., Troy, O., is a copper-nickel alloy electrode having a mineral flux coating for metallic arc welding. The weld deposits are non-ferrous, light grey in color, malleable, easily machinable and has a tensile strength equal to good cast iron. It is stated to be especially adapted to the welding of cast iron where the weld area must be machined, drilled or tapped anywhere in the weld zone. These electrodes are available in 3/32 in., ⅛ in., 5/32 in. and 3/16 in. diameters in 18 in. lengths, center brushed. They may be used on AC or DC current.

3

New Block Truck

A hand truck with forks to pick up and transport six concrete blocks at a time has been placed on the market by R. S. Reed Corporation, Three Rivers, Mich. When blocks are removed from pallets they are stacked on the floor—six high with bottom block face down. The Block-Man picks them up for piling in yard or on transport trucks. Each time thereafter, the six blocks are handled with the Block-Man to the job and on the job. With one block used as a pallet, other materials can likewise be handled — such as cement, pallets, bricks, etc.

New Reed Block-Man

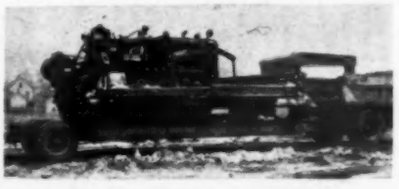
Mail Inserted Card

For data on equipment described on these pages. See also inquiry blank on page 129.

4

New Trailer

A trailer employing an entirely new hookup principle, which is fully patented, has been placed in production by Mead Machine & Iron Works, Inc., Warren, Penn. The trailer mounts directly on the dump truck body without special attachments or alterations to the truck, and the 5th wheel mat is readily adjustable to any standard



Mead Dump Truck Semi-Trailer

size body. It takes only a few minutes to attach or detach the trailer and truck. The unit is a low platform dump truck, semi-trailer, primarily designed for transporting construction equipment; such as shovels, dozers, etc., in capacities from 10 to 25 tons. The trailer has a single drop deck. Tires flush or above platform. Various platform heights from 28½ in. minimum, depending on tire size and whether flush or above floor. Frames are constructed from structural shapes, electric welded throughout, under rigid specifications and control.

5

New Flexible Tubing

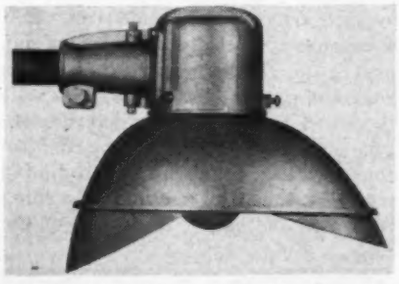
A new type of flexible tubing announced by Rouaflex Tubing Co., Inc., Philadelphia, Pa., has been tested up

to pressures of 980 p.s.i. without any indication of bursting, leakage or damage. This new tubing consists of a tough rubber tubing protected by strong steel wire braid cover to withstand abrasion, severe wear, and pressure. Rubber tubing is made of specially compounded synthetic rubber to resist the effects of oil and volatiles, while braiding is constructed of either galvanized or stainless steel, aluminum, or bronze for specific conditions. The tubing is available with hi-speed, snap-on couplings that can be connected and disconnected in one easy operation—in one second.

6

New Hoods for Lighting Reflectors

A new hood, Form 107, designed for its post-war line of high-efficiency reflectors for suburban street lighting, but at the same time interchangeable with older design reflectors, has been announced by the Lighting Division of the General Electric Co., Schenectady, N. Y. The Form 107 is a new design diecast aluminum hood



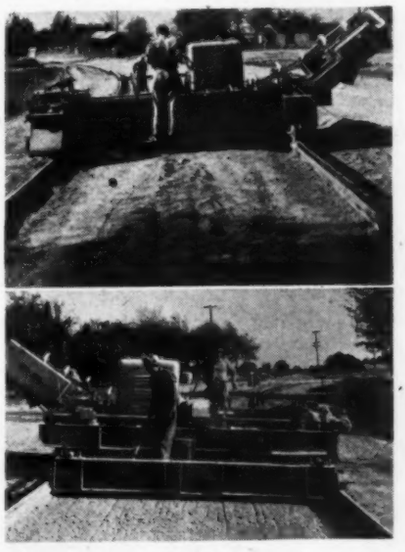
G-E Luminaire, Form 107SO, with Light Shields and 1¼-in. Pipe Fitter

with side mounting slip fitter for 1¼-in. pipe. Because of a novel arrangement of supporting brackets and mounting bosses, it can be set for either the 4⅜-in. light center, 1000-lumen lamp, or the 5¼-in. light center, 2500-lumen lamp in a few seconds, using only a screwdriver. When so set, the lamp position is maintained accurately and rigidly, thus assuring proper focus in the optical system of the luminaire.

7

New Vibratory Subgrader

The principle of vibration has been applied to the excavation of subgrades in a new subgrader now in regular production by Blaw-Knox Co., Pittsburgh, Pa. As a result of this use of vibration, the new subgrader is reported to reduce power consumption and lower the cost of preparing the subgrade. Features of mechanism and parts are as follows: Totally enclosed transmission running in oil. Transmission drives conveyor for disposal of excavated material, also drives cable drums for propelling machine forward. V-belt drive to vibration generators. Six-wheel mounting furnished with all models, with power drive for propelling machine in reverse. Vibrations at 2,000 impulses per minute produced by generators mounted on back of cutter assembly,



Front and Rear Views of Subgrader on Road Project at Alexandria, Ky.

which is equipped with reversible cutting edges and insulated from subgrader. Impact of vibrations flows in fore and aft direction directly into subgrade. Convenient controls for high and low speeds in forward movement, hydraulic ram for raising or lowering cutting edge with fingertip control for depth of cut and adjustable stop which is set for predetermined maximum cut, levers within easy reach of operator for controlling operation of cable drums, master clutch control, conveyor control lever. Subgrader adjustable for width by moving end trucks on main frame members. Rugged construction prevents misalignment of frame members and prevents internal movement which might be transmitted to road forms. Cutter blades of carbon-molybdenum steel.

8

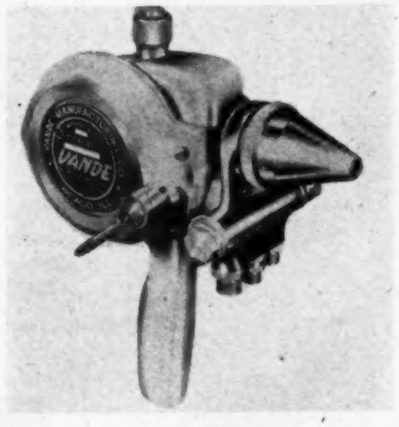
New Fuel Additive for Diesels

An additive for Diesel fuel oils which is claimed to produce more power with more economical use of fuel and at the same time reduce oil sludging is being marketed by Industrial Chemical Corp., Los Angeles, Calif. This product, Induco Fluid, when added to diesel fuel, takes immediate chemical action against the ever-present sulphur, rosin, gum and tar content of the average fuel oil, turns these into substances that will ignite efficiently upon injection. This, it is stated, makes it possible to reduce the volume of injection to a point where perfect combustion is attained.

9

New Metallizing Gun

A new metallizing gun, claimed to embody several exclusive design features, has been introduced by Vande Manufacturing Co., Chicago, Ill. The gun completely eliminates backfire. Its nozzle incorporates a new development of mixing the gas and oxygen at the point of combustion. Each wire nozzle is specifically designed to provide the exact volume for the gas used; acetylene, propane, or other gas. No air cap adjustments are needed. Another feature is the fingertip turbine control. Positive turbine control is achieved by a compound turbine containing a rotor and stator



Vande Metallizing Gun

responsive to opposing propulsion fluids. One propulsion fluid jet remains in a fixed position in the primary turbine. A second jet is directed by a control lever in the secondary turbine and either reduces or increases the primary turbine speed, thus affording complete wire feed control at all times.

10

New Metal "Weatherproofing" Material

A new tough-but-elastic coating material for "weatherproofing" outdoor metal surfaces has been an-

CONCRETE VIBRATION *is Our Meat!*

If you are looking for the best solution to any specific concrete vibration problem, or on the other hand, you simply want the best vibrator your money will buy, see the nearest JACKSON Distributor or drop us a line. Concrete Vibration is our meat!

For over 25 years we have specialized in the development and manufacture of the most efficient and reliable concrete vibrators for each and every type of concrete construction. And the record of JACKSON equipment in the field clearly demonstrates that that goal has been fully attained. The name "JACKSON" on any vibrator is complete assurance of thorough satisfaction.

The FS-7A ELECTRIC
(READY FOR IMMEDIATE DELIVERY)

Ideal on many types of construction. Built around the lightest, yet most powerful motor we have ever used on equipment of this character. Easy to handle or skid. Takes any of our standard heads up to 2⅜" x 18½" with flexible shafting in 24" to 14' lengths. Delivers up to 10,000 V.P.M. on AC or DC 110-120 Volt. Does many jobs formerly done only with larger machines.

Left: The FS-7A with reduction attachment to provide the most desirable shaft speed for wet or dry rubbing or grinding of concrete.

JACKSON
INTERNAL—EXTERNAL
ELECTRIC-FLEXIBLE SHAFT-HYDRAULIC
Concrete VIBRATORS

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON MICHIGAN

nounced by The Arco Co., Cleveland, and Los Angeles, manufacturers of industrial paints and allied maintenance products. Designed to simplify the long-term maintenance of bridges, storage tanks, transformers, water towers, harbor buoys, and other steel structures, this new material—called "Dum Dum for Metal"—was developed by the Arco Research Laboratories to meet the need for a metal protective material comparable to "Dum Dum Masonoc," which has been used widely for preservation of stucco, concrete and masonry structures for the past 35 years. Dum Dum for Metal is claimed to provide a durable coating many times the thickness of paint that makes the metal surface to which applied impervious to measurable vapor and moisture transmission, acid and alkali gases and fumes and other similar causes of deterioration, thereby preventing surface corrosion and disintegration due to these conditions.

11 New Curb and Gutter Machine

A new self-powered machine, developed by Dotmar Industries, Inc., Kalamazoo, Mich., is claimed to lay over 5 lin. ft. per minute of concrete curb and gutter. The machine is self-propelled by an air-cooled gasoline engine and runs in any standard steel form. It has a screen and roughing trowel at the front end and a finishing trowel at the back end. Ahead of the

Curb and Gutter Paver, Showing Rear Hopper and Finishing Trowel

finishing trowel is an eccentric tamper, operating at 400 r.p.m. Concrete is placed, between the forms ahead of the machine to the height of the gutter grade. As the machine travels over it, concrete is shovelled into hoppers "fore and aft" in the paver. Material deposited in the front hopper roughs in the curb and material deposited in the rear hopper finishes the curb. The machine can be used as a strip widener for pavement, and can lay lip curb

I DOUBLED my truck's earning power

with a

DETROIT AUTOMOTIVE

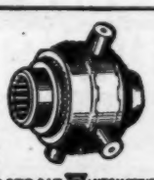
Thornton Drive

"Yes, sir! I really hit a gold mine when I put Thornton 4-Rear Wheel Drive on my medium truck! That Thornton Drive has made my medium truck into a heavy hauler—a powerful, high capacity, rugged 6-wheeler. It has doubled my profits by doubling my payloads and increasing my performance by nearly 100%—yet I still have the operating economy and advantages of a medium truck!

"Figure it out yourself. My medium truck had a G. V. W. of 14,000 pounds. When equipped with a Thornton Drive, that same truck has a gross of 30,000 pounds. This additional equipment increased my body and chassis weight by only 78%. Therefore, the payload was more than doubled.

"And performance? My Thornton Drive, using 3 NoSPIN Differentials*, gives me *two* driving axles, *four* driving wheels—each with powerful, positive, independent drive. With that increased traction plus the Thornton Drive's rugged walking beam springs, I can *get out* of mighty tough places—do jobs I'd never attempt otherwise. My performance is 100% better both on the road and on those rugged off-the-road jobs.

"Yes, sir—any trucker can hit the profit jackpot—*double his earning power*—by converting his medium equipment to heavy capacity, high performance trucks with Thornton 4-Wheel Drive!"



DETROIT AUTOMOTIVE

***NoSPIN Differential Is a Profit Saver!**

NoSPIN is standard equipment in the 2-speed gear case of the Thornton Drive, providing positive drive to both rear axles and eliminating axle fight over any terrain.

When NoSPINs are also used in both driving axles (optional), positive drive is provided to all four rear wheels.

NoSPIN Differentials are also available for single axle trucks.

DETROIT AUTOMOTIVE PRODUCTS CORPORATION

(Formerly Thornton Tandem Co.)

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Easy-handling MM Industrial Tractors have balanced weight and power, a wide range of speeds and front or rear power take-off for the efficient handling of a wide variety of attachments. Low operational and maintenance cost and easy accessibility for servicing recommends MM for use with: pull-behind and side-mounted mowers, V-type and reversible plows, bulldozers, rotary brooms, flushers, bucket or fork loaders, winches and cranes.

The MM 27 H.P. RTI and 49 H.P. UTI Industrial Tractors are BUILT TO DO THE WORK *conveniently, safely, economically.*

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MINNEAPOLIS-MOLINE MODERN MACHINERY

MINNEAPOLIS-MOLINE POWER IMPLEMENT COMPANY

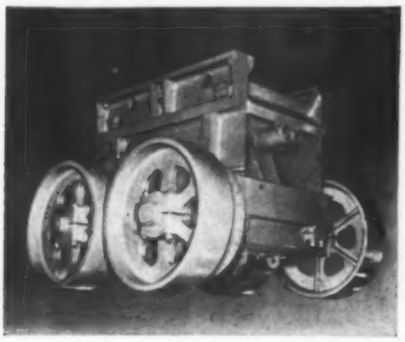
MINNEAPOLIS 1, MINNESOTA

as well as any standard curb because the screed, strike-off and finishing trowel can be changed in a simple operation.

12

New Twin Jaw Crusher

A line of jaw crushers with two movable jaws instead of one movable jaw and one stationary jaw has been announced by Iowa Manufacturing Co., Cedar Rapids, Iowa. The twin



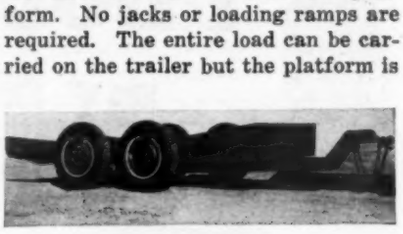
Cedar Rapids Twin Jaw Crusher

jaws are operated by two eccentric shafts and a double set of flywheels. The twin jaw crushers are stated to be specially suited for installation in portable plants because of the reduction in drives and savings of space by combining lengths, heights and widths of two crushers into one. Tests have shown that the maintenance cost of the manganese jaws has been greatly reduced because of the action of both movable jaws. A twin jaw crusher may also be used as a primary or a secondary crusher where there is an unusually high percentage of crushing of larger-sized gravel. Four sizes are available: 12 x 16, 16 x 24, 12 x 36 and 18 x 36.

13

Two New Tilt Trailers

Two new tilt type trailers for transporting tractors, rollers, compressors, shovel-loaders, mixers, etc., have been announced by C. R. Jahn Company of Chicago and Savanna, Ill. The larger of the two tilt trailers known as Model JT-408 has a capacity of 8 tons. The entire load is carried on a tandem axle with four wheels and tires. The smaller model, JT-205, has a single axle and capacity of 5 tons. Both models are perfectly balanced so one man can raise or lower the platform. No jacks or loading ramps are required. The entire load can be carried on the trailer but the platform is



New Jahn Trailer

so designed that the load may be shifted to transfer any desired weight to rear of the truck when greater traction is required. Positive automatic safety lock holds platform in position when loaded or empty. Rubber-mounted drawbar absorbs road shocks to protect both truck and trailer.

14

New ⅜-Cu. Yd. Excavator

The Osgood Co., Marion, O., has announced the development of the Type 5, Model 5-C, its newest addition to the ⅜-cu. yd. excavator and material handling class. It is available as a shovel, dragline, clamshell, crane, and hoe, and is readily interchanged

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STRONGER

WELLMAN

Williams Type BUCKETS

Stronger because they're constructed of **welded rolled steel**... *lighter* because non-essential weight has been eliminated. Wellman buckets meet every requirement of heavy service with longer life and lower cost! A type for every service: Multiple Rope, Power Arm, Dragline, Power Wheel, Special Service. ⅜ to 16½ yd. capacity.

SEND FOR BULLETIN

THE WELLMAN ENGINEERING COMPANY

7003 CENTRAL AVENUE CLEVELAND 4, OHIO

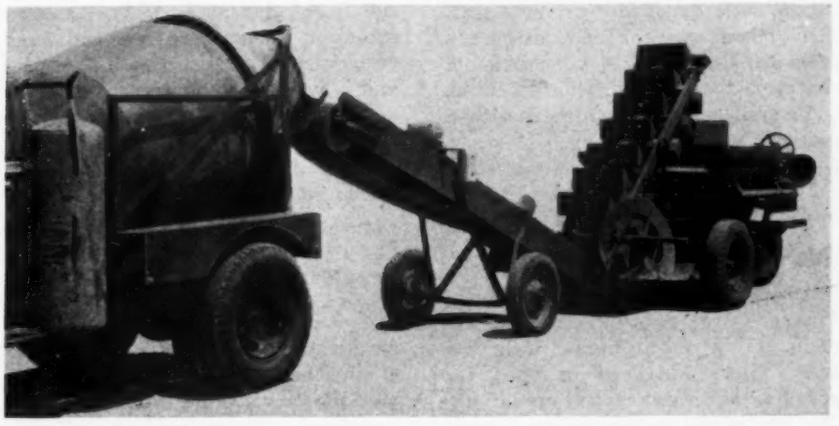
from one class of service to another. All main operating machinery is positioned on a welded deck, proportioned properly to take all strains and stresses set up in operation. It may be powered with either gasoline or diesel engine. Twin disc clutches activate the swing, travel, and hoisting motions. All operating controls

Osgood Type 5, ⅜-Cu. Yd. Excavator

are grouped around, and in front of, the operator. Cab is designed to give the operator full view of his work, and complete protection from the weather. A new principle in rope crowding mechanism, patented by The Osgood Co., is employed on the Type 5. Racking and drums on the boom, as used on old style rope crowds have been eliminated, and the ropes are arranged to give a direct, positive, independent crowding action.

15
Concrete Equipment

An equipment combination for handling and batching aggregate, conveying it to the mixer, and mixing its concrete has been announced by Willard Concrete & Manufacturing Co., Lynwood, Calif. A component of the Willard set-up is a mobile, self-loading weigh-batcher. This picks the aggregate off the ground with an endless chain bucket elevator, weighing the batch on a 3-beam, boxed in standard scale which individually weighs the sand, rock and gravel and cement. This device permits stock piling on the ground, right on the job as well as "at the yard." This weigh-batcher has a 2½ yd. capacity, weighs 5,880 lb., is driven by a 4-cylinder, 40 H.P. Ford tractor motor, and is mounted on truck wheels. Construction is all-welded steel. For loading the Willard mixer, a conveyor is employed, which is also mobile and wheel



The "Speed-King" Equipment Combination for Concrete

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PERFECTION
IS THE NAME TO REMEMBER
WHEN YOU WANT THE
BEST
IN BODY AND HOIST CONSTRUCTION

"300 Series" Heavy-Duty
DUMP BODY
with
ISO-DRAULIC
ROLL-A-LIFT

Write for name of nearest Distributor.
The PERFECTION STEEL BODY CO.
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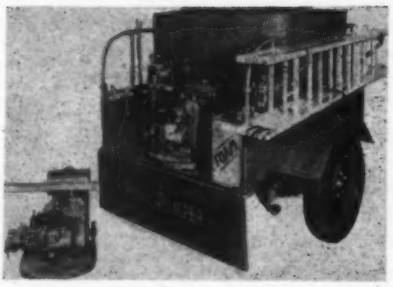
PERFECTION
STAKE and DUMP BODIES
HYDRAULIC HOISTS

FOR ANY TRUCK
STANDARD or SPECIAL UNITS
IN ALL SIZES • FOR ANY USE

mounted. This slides under the weigh-batcher at the low end, receiving the load on an endless 20-in. rubber conveyor belt which in turn unloads into the mixer drum, at the high end. Operation is via either at 5 H.P. air-cooled gas engine or a 2 H.P. electric motor, as preferred. The frame is of rigid weld-steel construction, fitted with two auto wheels. The Willard Mixer, third element in the set-up, fits on any 1½ ton, short wheel base truck. It operates off the truck power take off, via a steel roller chain. It is regulated by a rear outside throttle, as well as at the driver's seat. The mixer weighs approximately 2,000 lb. It has a 2½ yd. maximum capacity, a one-man discharge chute, is reversible, and is equipped with a pressure water tank.

16
New Fire Fighting Trailer

An optional model of the Porto-Pumper fire fighting trailer, announced by Porto-Pump, Inc., Detroit, Mich., also can be used for spraying and weed control operations. The new model carries the same basic equipment as the standard Porto-Pumper: Demountable, independent-



"Camel" Model of Porto-Pumper

powered, 85-lb. high-pressure utility Porto-Pump; 50-ft. of supply hose, 200 ft. of fire hose; 18-ft, 3-section extension ladder; fire axe and hand extinguisher; a selection of nozzles and hydrant adapters—plus the added feature of a 200-gal. tank. The 200-gal. tank makes Porto-Pumper suitable for use for spraying and weed-control operations.

17
New Trailer

A new trailer, announced by Arthur Rehberger & Son, Inc., Newark, N. J., eliminates all needs for skidding, blocking or winching in loading heavy equipment. When loading, tail skid is lowered and loading platform is raised by means of hydraulically controlled, hand operated pump. Equipment is driven on trailer, under its own power, with tail skid serving as ramp. Release valve is then opened so that loading platform will return to its original position and automatically lock. The tail skid is then raised to shorten overall vehicle length and to serve as barrier for load. When unloading, same procedure is followed and equipment is driven off under its own power. The trailers are constructed with pressed steel frames which are said to provide a liberal

Tip-Top Trailer

factor of safety in the case of unavoidable overloads and are offered in 2 standard models, a 7-ton capacity (single axle) and a 12-ton capacity (tandem axle). Where desired, special sizes can also be made to order.

GET INTO THE KING ROW —GET a HANSON!

MORE POWER • VERSATILITY
SPEED • ECONOMY

Compare these "KING-SIZE" features:
Full-revolving chain crowd fully enclosed steel cab air controlled steering all-welded, steel construction disc type clutches on swing internal-expansion, booster-type clutches on hoist and crowd all clutches easily adjusted and relined without removing shaft assemblies extra long crawlers and low center of gravity speedy, versatile and rugged!

Shovel made in ⅜ yd. and ½ yd. sizes. Convertible to 4½ ton and 6½ ton cranes, respectively. Write for complete specifications. Dept. RS-127.

HANSON
CLUTCH AND MACHINERY CO.
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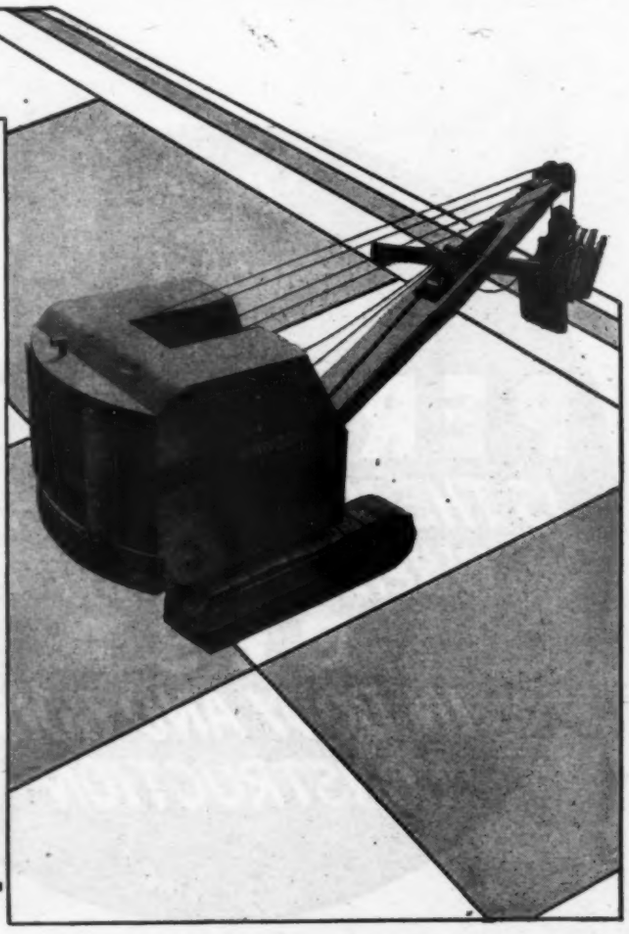


18

New Mowing Machine

A new mowing machine that is attached to the front of a four-wheel vehicle is now in production by Turner of Indiana, Inc., Indianapolis, Ind. It is manufactured primarily for the Willy's Jeep and other four-wheel tractors. The principle patented feature of the Turner mower is the manner in which the "head" can be locked in any position to follow

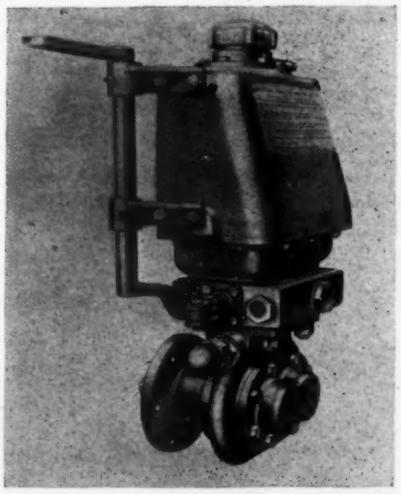
Turner Mower

the contour of the ground. The cutter blade may be attached in center position to cut directly in front of the vehicle, or it can be attached so that it will cut to left front or right front. In either of the three positions the 6-ft. sickle bar is in full view of the operator at all times. The blade is controlled and easily maneuvered from the driver's seat. The mower requires but 1½ hours to make original installation and less than 5 minutes to attach or detach afterwards. Only two bolts are used in detaching and attaching the mower after original installation.

19

New Hydraulic Units

A complete new line of hydraulic products is now being offered by La Plant-Choate Manufacturing Co., Inc., Cedar Rapids, Ia. These include hydraulic pumps, motors, valves, cylinders and a compact 3-in-1 power unit which incorporates in one design, a pump, control valve and reservoir. Pumps, motors, and power units are available in four sizes—15, 25, 40 and 60 gpm. Cylinders are available in three sizes—4-in., 5-in. and 6-in. diameters. Valves come in two sizes—for control of flows up to 50 gpm and 70 gpm. Pumps and motors include such design features as interchangeable spur-type gears, needle roller bearings, positive lubrication, and bronze reversible thrust plates. The pumps are designed for automotive, portable or stationary installations and may be electric motor or



New LaPlant-Choate Unit

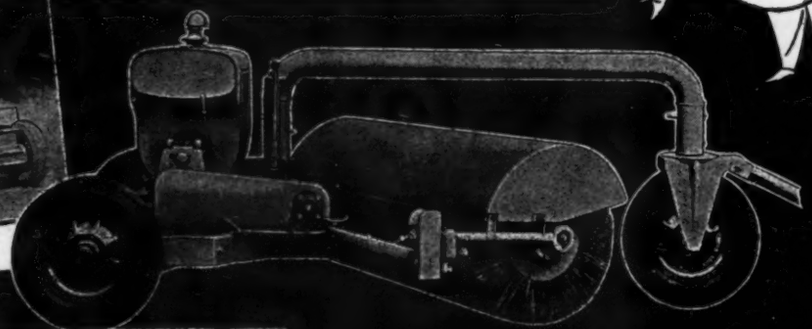
engine driven. The power unit incorporates some revolutionary principles such as surge control, a supercharged pump and small capacity reservoir. Valves are spool-type, three positions (float position optional) and self-centering and may be

LITTLE JOE SAYS:

A New Broom Sweeps Clean and LITTLEFORD BROOMS STAY NEW

Before you apply bituminous materials, sweep the surface really clean with Littleford brooms. Power or traction driven, these brooms sweep in either direction; only two minutes needed to make the change. They're sturdy and tough; hydraulic lift raises and lowers brush to regulate tension. These three wheel brooms turn in small radius. Can be equipped with sprinkler system; one can use two-way blower. Get the whole story on Littleford brooms; ask for Bulletin No. 19.

This Traction Driven Broom gets its power from the rear wheels.



BLACK TOP ROAD MAINTENANCE EQUIPMENT LB SINCE 1900

LITTLEFORD

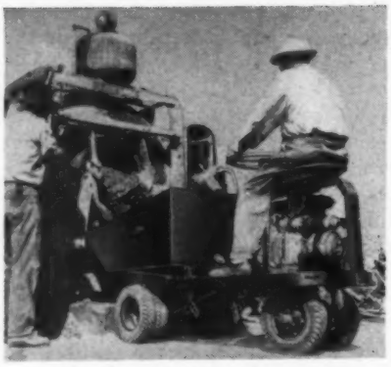
LITTLEFORD BROS., Inc.

454 E. PEARL ST., CINCINNATI 2, OHIO

had with or without automatic surge control. Cylinders are double acting and can be mounted in any position. Pistons are ring-type for high pressure sealing with piston rods chrome plated.

20
New Motorized Wheelbarrow

A new motorized wheelbarrow, announced by Whiteman Manufacturing Co., Los Angeles, Calif., is powered by a 6 H.P., 4 cycle, air-cooled engine with an automatic clutch and variable speed changes through worm gear reducer, and is stated to be capable of hauling 2,000 lb. at speeds from 2 to 15 mph forward and reverse. The unit, with single wheels is only 28 in. wide, with dual wheels is 36 in. wide, with all wheels, in either case, interchangeable, like auto wheels. Tires are standard wheelbarrow tires obtainable at most hardwares. The unit weighs 750 lb.



Whiteman Power Buggy

For resurfacing secondary roads and city streets...

ALSO FOR NEW CONSTRUCTION

● Here, for the first time, is a self-contained, single-unit machine which accomplishes the entire mixing and laying job in one continuous operation. The Moto-Paver delivers the mixed material spread and struck off on the road surface, ready for rolling. Paving width is adjustable from 8'6" to 12'0", and thickness up to a maximum of 7". The strike-off blade is adjustable to hold accurately to specified grade and crown.

The Moto-Paver has been successfully operated using gravel, stone or slag aggregates, and with most types of emulsions, RC, MC and SC asphalts and tars. Illustrated bulletin giving complete information and specifications will be sent on request.

HETHERINGTON & BERNER INC., 721 Kentucky Ave., Indianapolis 7, Ind.

H&B Moto-Paver

THE COMPLETE TRAVELING MIXER AND PAVER

MANUFACTURERS' LITERATURE

21
Soil Compactor

The Jackson soil compactor is illustrated and described in a circular issued by Electric Tamper & Equipment Co., Ludington, Mich. This is a self-propelled light-weight electric vibratory compactor designed for use in areas inaccessible to the large tractor drawn equipment. It is stated to firmly compact 10 sq. ft. to 15 sq. ft. per minute to a depth of 12 in.

22
Trucks for Concrete Bodies

New literature describing FWD trucks available for mounting ready-mixed concrete bodies has been announced by The Four Wheel Drive Auto Co., Clintonville, Wis. Titled "Mixers On The Move," the folder describes use of its trucks in capacities ranging from 20,000 lb. to 38,000 lb. gross vehicle weight for use with mixers from 2 to 5½ yds. capacity.

23
Synthetic Resins

A new technical booklet which for the first time includes a description of the properties and uses of all its synthetic resins is now available from Hercules Powder Co., Wilmington, Del. Hercules synthetic resins, most of which are rosin-base, have found application in a wide number of industries including protective coatings, adhesives, printing inks, paper and textile sizes, linoleum and floor tile, and essential oils and fixatives. A key to specific uses for Hercules synthetic resins is provided by a chart which matches the resins with their actual and potential uses.

24

Shovel, Crane, Dragline

A new 24-page bulletin containing a complete, detailed description of the Lima Type 604 shovel, crane and dragline has been published by the Lima Shovel and Crane Division of the Lima - Hamilton Corporation, Lima, O. Many illustrations are contained in the new bulletin showing details of construction and operating advantages including the application of "precision" air control. Liberal space is given to specifications, capacities, and working ranges.

25

Construction and Maintenance Tools

The entire line of Syntron equipment is described in a new 92-page catalog issued by Syntron Company, Homer City, Pa. Included in the catalog, in addition to the complete line of vibratory material handling equipment, is a description and illustrations of their construction and maintenance tools which include self-contained gasoline hammer paving breakers, portable electric hammers, drills, grinders, sanders, electro-magnetic form vibrators and flexible shaft concrete mass vibrators.

26

Tractor

A 6-page folder describing the new HD-19 torque converter tractor is being distributed by the Tractor Division, Allis-Chalmers Manufacturing Co., Milwaukee, Wis. A 3-page center spread lists many of the new unit's prominent features such as its 40,000 lb. weight, 163 net engine horsepower, and its hydraulic torque converter drive. A pictorial page of "on-the-job" views portrays application of the HD-19 on a variety of jobs such as stump removal, road building, logging, bulldozing, and earth moving with scrapers. A full page of specifications relative to engine construction, steering design, speeds and drawbar pull, and general dimensions of the tractor is included.

27

Scrapers

Improved operation and construction features of the Wooldridge Terra-Cobra high-speed self-propelled earthmovers are fully illustrated and described in a new 12-page bulletin just released by Wooldridge Manufacturing Co., Sunnyvale, Calif. Descriptive data is combined with on-the-job photographs. The positive two-wheel hydraulic stearing action, pioneered by Wooldridge five years ago, plus the flexibility articulated oscillating king pin pivot are among the features covered in detail by the new bulletin.

28

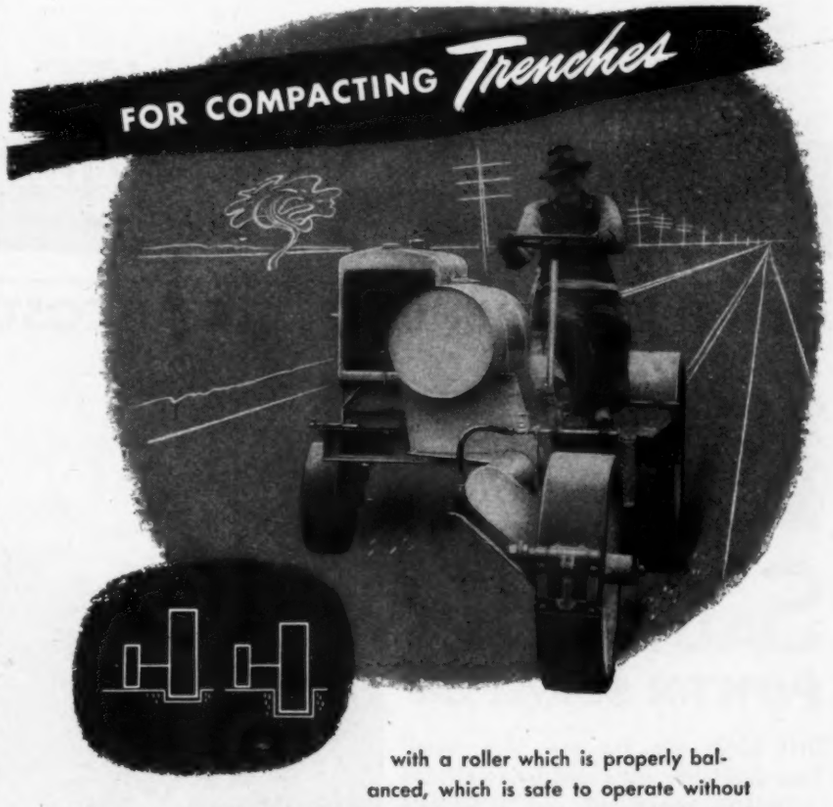
Joint Installing Machines

The operations of Flex-Plane joint machines now equipped for vibratory joint cutting are described in a bulletin issued by Flexible Road Joint Machinery Co., Warren, O. The bulletin describes the operation of a Flex-Plane joint machine on the Patterson Field VVHB runway, and illustrates various types of longitudinal dummy joint installations. It also pictures recent modifications to Flex-Plane joint installing equipment.

29

Belt Conveyor Systems

Vital information necessary for laying out a belt conveyor system is contained in a new bulletin on Robins idlers issued by the Robins Conveyers Division, Hewitt-Robins Inc., of Passaic, N. J. The new bulletin, No. 120-A1, amplifies the previous issue, incorporating important changes in engineering details. It also points out features of the Robins idlers.



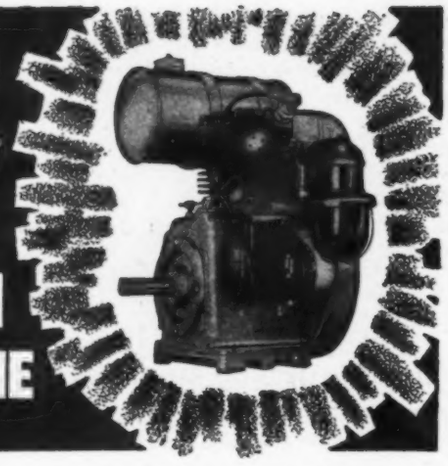
with a roller which is properly balanced, which is safe to operate without tipping, and which is designed specially for that job. A simple, hydraulically operated mechanism provides vertical adjustment for the road wheel so that the roller can be kept level when operating in the trench. This hydraulic unit is exclusive with Buffalo-Springfield trench rollers. Compressions exceeding 300 #/" of face can be obtained with this model. See your Buffalo-Springfield distributor for further details.

BUFFALO SPRINGFIELD

THE STANDARD OF COMPARISON

SPRINGFIELD OHIO

Now you can get Immediate Delivery on this 2 to 4 Hp. WISCONSIN Air-Cooled ENGINE



Tremendously increased production capacity for our smaller sizes now enables us to offer our Models AB and AK engines (2 to 4 Hp) for immediate delivery — in volume to manufacturers of power-operated equipment, or through authorized distributors and dealers on individual purchases.

These are heavy-duty, 4-cycle single cylinder engines that carry "Most Hp. Hours" service ratings. Equipped with tapered roller bearings at BOTH ends of the drop-forged, dynamically balanced crankshaft for long life and protection against bearing failure; high tension outside magneto with impulse coupling for quick, easy starting in any weather; pump-circulated constant level splash lubrication system (no grease cups or oil fittings). Net weight: Model AB, 76 lbs.; Model AK, 77 lbs. Speed range: Model AB, 1600-2600 rpm; Model AK, 1600-2400 rpm.

●

For further engineering data, prices, etc., write, phone or wire . . . or see your authorized Wisconsin Engine distributor or dealer.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 14, WISCONSIN

FAST DIRT MOVING AT LOWEST COST

only a 1-Man JOB

WITH A SAUERMAN POWER SCRAPER

ONE MAN does the work of a squad! Time and labor are saved by combining DIGGING, HAULING and DUMPING in a continuous process with one operator. *Fast and dependable handling at lowest cost.* Sauerman Machines provide wide range of handling capacities and operating spans.

SEND FOR SAUERMAN CATALOG
Shows many types of scraper and cableway machines meeting all requirements.

Above is a Sauerman Crescent Scraper stripping low-grade clay and other topsoil to uncover valuable deposit of china clay. Scraper drags the overburden to waste pit in distance—a good example of the ability of Sauerman Scrapers to make easy work of otherwise costly jobs.

●

SAUERMAN BROS., Inc.
588 S. Clinton St., Chicago 7, Ill.

30

Truck Mixer

Blaw-Knox Co., Pittsburgh, Pa., has prepared Bulletin No. 2223 on the Hi-Boy Trukmixer, its recent introduction into the high-discharge type of truck mixer. The pamphlet is illustrated with service and construction views and gives specification data and operating information on the new unit.

●

How Far Will a Motorist Park from His Destination

(*Continued from page* 66)

highway department engineers to believe. Instead of regulating downtown traffic speed, traffic lights often work in reverse. Motorists are apt to step on the accelerator in an effort to make a green light.

And as to m.p.h. signs, through bitter experience, traffic engineers have learned that speed signs in themselves are worthless. The reasons behind restrictive speed zones must be obvious to the motorist, or the signs are unlikely to be observed. For "people slow down due to conditions, not signs," the Virginia engineers have found. In line with this, the Virginia highway department is replacing some of the 25 m.p.h ones with 35 m.p.h zones in small communities on busy highways.

At the same time, an attempt is being made to cut down on the number of informational and regulatory signs along the highway; it is found that too many signs create a disrespect for those signs where they are needed. This action was considered necessary in spite of a continued demand for more regulatory signs.

WITH THE MANUFACTURERS & DISTRIBUTORS

New Barber-Greene Distributor

Capitol Equipment, Inc., Troy, N. Y., has been appointed by Barber-Greene Co., Aurora, Ill., as exclusive distributor in the Albany and Mohawk Valley Territory, representing the Barber-Greene Construction and Industrial Divisions.

Davis Appointed Sales Manager

H. J. Davis

F. S. Jones, general manager of sales for the Western Division of The Colorado Fuel and Iron Corporation, has announced the appointment of Howard J. Davis as manager of sales for wire products, replacing John T. Brittain, whose transfer to the Pacific Coast was recently announced. Mr. Davis came to CF&I in 1940 to establish a Welded Wire Fabric Division. Three years later he was appointed assistant manager of wire product sales. In June of 1947, he was appointed manager of product research and development for the Western Division.

Moves Michigan Office

Clay Sewer Pipe Association, Inc., Columbus, O., has moved its Michigan office to 610 Eddy Bldg., Saginaw, Mich. C. J. Bauer, Jr., district engineer, is located at that office.

Vader Promoted by Diamond

C. L. Vader

Clifford L. Vader has been appointed assistant general sales manager of Diamond Iron Works, Inc., Minneapolis, Minn. Previous to entering the Diamond Sales department in 1942, Mr. Vader spent 11 years with the Rosholt Co. as salesman of roadbuilding machinery, followed by several years of partnership in the sewer, water and bridge building firm of Theodore Jensen Co. and as superintendent of roadbuilding and heavy construction projects in the Northwest.

Joins General Tire

Larry M. Baker, has joined the General Tire & Rubber Co., Akron, O., as manager of interplant technical service. One of the first rubber

A ROGERS 'Tagalong' Trailer AND YOUR DUMP TRUCK

...form a PROFIT-PRODUCING TEAM

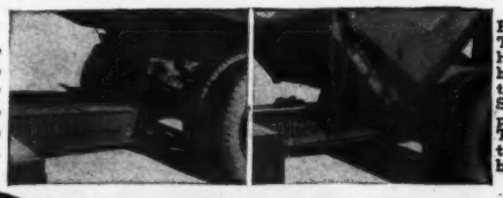
Contractors everywhere are turning to the Rogers "Tagalong" for a bigger day's work with maximum economy.

One man can do all jobs. Load and unload trailer, connect and disconnect it; drive truck and operate equipment carried.

Ideal for light and medium shovels, cranes, bulldozers, etc.

Write for complete information.

Showing cable around sheave and dump body about to be raised to engage towing tongue.



Body elevated. Tightened cable has raised drawbar and engaged towing tongue. Safety coupling pin is inserted. Trailer is ready to roll when body is lowered.

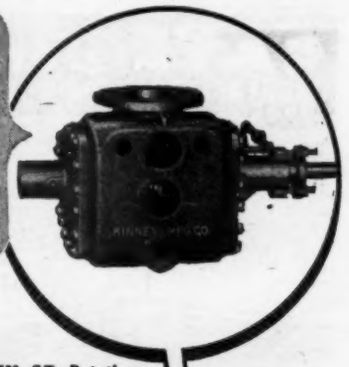
ROGERS HEAVY DUTY Gooseneck Trailers

ROGERS BROTHERS CORPORATION

DESIGNERS and BUILDERS of HEAVY DUTY TRAILERS SINCE 1915

110 ORCHARD ST. ALBION, PENNA.

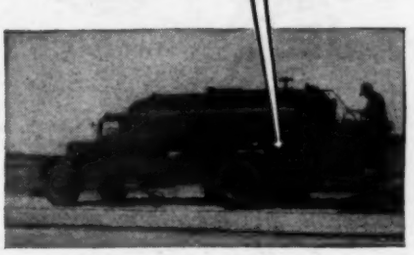
only KINNEY BITUMINOUS DISTRIBUTORS have this famous KINNEY PUMP



KINNEY SD Rotating Plunger Pump. Bolts directly to tank outlet. Capacity 405 G.P.M.

The KINNEY Rotating Plunger Pump is the heart of the KINNEY Distributor . . . its high capacity makes loading faster, speeds up application and permits fast road speeds. The pump jacket, connected to the truck exhaust, heats material left in the pump, for easy starting. The pump is accurate as a meter—the KINNEY Distributor will apply tar, asphalt, road oil, cut-back and emulsions in the exact amount specified by the highway engineers. The KINNEY Distributor is recognized as a top performer in all parts of the world.

Write for Bulletin.



KINNEY MANUFACTURING COMPANY

3537 WASHINGTON STREET, BOSTON 30, MASS.

New York • Chicago • Philadelphia • Los Angeles • San Francisco

We also manufacture Vacuum Pumps, Liquid Pumps and Clutches

EAGLE
MODEL 400
LOADER

LOWER YOUR LOADING COSTS

A truly modern loader that incorporates the latest and best ideas in design, function and control. Conveyorized discharge chute permits lower overhead clearance, (11'9") and speedier handling of material.

IT DOES THIS: Gets from job to job at truck speed. Handles any loose material quickly and economically.

WITH THESE: One man operation—Hydraulic control—Capacity—3 to 5 cu. yds. per minute—Positive chain crowd—Mounts on any standard 1½ or 2 ton chasis—Self feeding augers feed material constantly, efficiently, into 20" buckets.

Write for further information and name of your distributor

EAGLE
JAW CRUSHERS · IMPACT BREAKERS
PULVERIZERS · CONVEYORS · LOADERS
CRUSHER CO., Inc. GALION OHIO·U·S·A.

SAVE $ and
INCREASE TRACTOR POWER

The Bulldozer Blade Nu-Edge Bar is butt-welded to new or worn blade and welding bead covered with a thin layer of hard-surfacing electrode—Affording 2,000% savings in blade replacements.

BULLDOZER TRACTOR GRIP-LUGS are easily welded to any size grouser shoe without dismantling assembly. Made of special work-hardening steel which becomes tougher with use — outwearing original grouwer.

See Your Local Dealer
Send for Folder RS Today.

SOLE PRODUCERS
ALLIED STEEL PRODUCTS, INC.
7835 BROADWAY · CLEVELAND 5, OHIO

Use our
"CLEARING HOUSE"
advertising
for used and
second hand
equipment.

chemistry majors to be graduated at Akron University, Baker has been active in the rubber manufacturing field for the last 14 years following 3 years in artificial leather development work.

Max Berns Is Dead

Max A. Berns, Publicity Manager, Universal Atlas Cement Co., United States Steel Corporation subsidiary, died suddenly of a heart attack Nov. 19 at his home at 155 Centre Ave., New Rochelle, N. Y. Mr. Berns was graduated from University of Illinois

Max A. Berns

in 1910 with a B.S. degree in civil engineering. He joined the Universal Atlas Cement Co. at Chicago in 1913 as publicity representative, leaving the company in 1917 to serve in France during World War I as captain of U. S. Engineers. He returned to the company's Chicago office in 1919 and was made publicity manager of the company in 1920. Before coming to New York in 1938, Mr. Berns lived in River Forest, Ill., where he was prominent in civic affairs.

In his 27 years as publicity manager of Universal Atlas, Mr. Berns ably directed advertising and public relations activities. From the early days, when the use of concrete on farms was being publicized and on through the years with the introduction of new cements and the promotion of their uses to new markets, Mr. Berns was in the forefront with keenly conceived and skillfully executed publicity campaigns in furtherance of his company's position in the field.

New Rock Bit Plant

The Timken Roller Bearing Co., Canton, O., has purchased the 8-acre site and taken over all construction on the new $150,000 rock bit plant at

Colorado Springs, Colo. The plant was originally scheduled to be built by the Colorado Springs Chamber of Commerce and leased to the company but it was later decided that the company would build the plant. Frank M. Givin, general foreman of the company's Mount Vernon plant, was named manager of the new unit. A daily output of some 10,000 rock bits per day has been scheduled for the new unit.

C. F. Winchester in New Washington Office

C. F. Winchester, construction equipment manufacturers' representative announces the removal of his office from 1928 Eye Street, N. W., Washington 6, D. C., to the Denrike Building, 1010 Vermont Avenue, N. W., Washington 5, D. C., effective Nov. 15, 1947.

After nearly seven years as Executive Secretary of Associated Equipment Distributors, Mr. Winchester resigned his position with the trade body and is now engaged as Washington representative for American Conveyor Co., Chicago, Ill.; Fontaine Truck Equipment Co., Inc., Birmingham, Ala.; Gar-Bro Manufacturing Co., Los Angeles, Calif.; Insley Manufacturing Corp., Indianapolis, Ind., and New Holland Manufacturing Co., Mountville, Pa. With the exception of Insley Manufacturing Corp., he is also export representative for these companies and Jones Superior Machine Co., Chicago, Ill.

Mr. Winchester, who has resided in the Washington, D. C., area since 1927, is well known in government circles and is making arrangements with a large number of foreign distributors to handle his clients' products.

Personnel Changes at Koppers

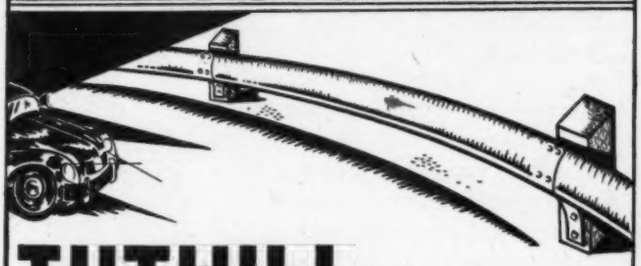
Personnel changes resulting from reorganization of the Tar Products Division of Koppers Co., Inc., Pittsburgh, Pa,, have been announced by J. N. Forker, vice president and general manager of the division. H. B. Cummings has been appointed manager of the Planning and Procurement Department. R. C. Stromquist has been appointed manager of the Production Department. R. B. Holmes has been appointed manager of the Sales Department. Other appointments in the reorganized Sales Department are as follows: Assistant Manager, J. C. Macon, Jr.; Statistical & Research Section, W. H. Reed, Manager; Creosote and Pitches Section, G. A. Wagner, Manager; Refined

ASPHALT and TAR KETTLES

FIRE PROOF—OIL BURNING
Hand and Motor Driven spray.
Many sizes. Write for catalog.

Elkhart White Mfg. Co. Indiana

IN THE SPOTLIGHT!



TUTHILL GUARD RAILS

for safe, sure service

Up-to-date highways need modern guard rail protection. Here's why it will pay you to install the TUTHILL Guard Rail:

SAVES LIVES. The springy, convex rail keeps cars from going off the road. At night, too, it shows up clearly under headlights, plainly marking the course of the road.

SAVES DOLLARS. The one-piece, weatherproof Tuthill Guard Rail is simplicity itself. Easy and quick to erect. Never can sag. Requires little or no maintenance.

Be wise. Select the Tuthill Guard Rail for your highway installations.

TUTHILL SPRING CO.
761 W. POLK STREET, CHICAGO 7, ILLINOIS

ETNYRE

"Black-Topper"

BITUMINOUS DISTRIBUTORS

ACCURATE...DEPENDABLE...ECONOMICAL

On new road construction or making those much needed road repairs you can do the job faster, better and cheaper with an Etnyre "Black-Topper"... designed to save you time, labor and material. See your Etnyre dealer or write direct.

E. D. ETNYRE & CO., Oregon, Illinois

OWEN
CLAMSHELL BUCKETS
INSURE A BIGGER DAYS WORK
A MOUTHFUL at EVERY BITE
This is not only the claim of OWEN, the name symbolic of the highest grade Excavating and Handling Buckets for years. — Operators everywhere, "on and off" the job, volunteer this testimony.
And — there's a reason. Owen-engineered buckets incorporate special features which have been continually improved.
Branches: NEW YORK PHILADELPHIA
THE OWEN BUCKET CO.
6070 Breakwater Ave. • Cleveland, Ohio
CHICAGO BERKELEY, CAL.
and MORE BITES PER DAY

Coal Tar Products Section, J. H. Carpenter, Manager; Agency Products Section, C. R. Willetts, Manager; Hot Applied Coatings Section, H. E. Crane, Manager; Road Materials Section, C. B. Kyser, Manager; Building Materials Section, D. D. Hamilton, Manager; New England District Sales, M. D. Gill, Manager; Eastern District Sales, W. H. Thornhill, Manager; Pittsburgh District Sales, D. S. Snow, Manager; Midwestern District Sales, W. O. Boyd, Manager; Southern District Sales, F. G. Owen, Manager; Pacific Coast District Sales, G. C. Stephenson, Manager.

M. E. Army Is Dead

M. E. Army, veteran employee of the Lima Shovel and Crane Division of Lima-Hamilton Corporation, Lima, O., died suddenly at his home in Glendale, Calif., on Oct. 31. Since 1935, "Mick", as he was known to his many friends, has made his headquarters with the Lima sales agent, Smith Booth Usher Co., 2001 Santa Fe Ave., Los Angeles, Calif. He joined the Lima-Hamilton organization in 1928 as service engineer, later becoming sales and service engineer, and then assistant district manager, the position he held at the time of his death.

Appointed Parts Manager

H. F. Haven

Herman F. Haven has been appointed Western Division parts manager for Caterpillar Tractor Co., Peoria, Ill. He joined "Caterpillar" in 1942 as an order interpreter. He became assistant western division parts manager in 1945, parts technical manager in 1946 and manager of parts publications division in April, 1947. He succeeds Eldon Mason who resigned to become general parts manager for Holt Bros., "Caterpillar" distributors with offices at Stockton, Lodi and Tracy, Calif. W. E. Doersam continues as assistant Western Division parts manager.

Hillsman Erecting New Building

Construction is well advanced on a new building for the Hillsman Equipment Co., at 2000 N. Hawthorne St., Melrose Park, Ill. The Hillsman Co. has for many years been Chicago and Northern Illinois distributors of many well known lines of heavy construction equipment—cranes, shovels, drag lines, paving mixers, concrete mixers, trenchers, etc. The new building, on a tract of over 25,000 square feet, is 50x165 ft. and is expected to be in complete operation before May 1.

Cataphote Increases Territory

John A. Williamson, manager of the Cement Products Division of Cataphote Corporation, Toledo, O., has announced that additional territory has been added for the distribution of Darex AEA, air entraining agent. In addition to Ohio, Indiana, Michigan and Kentucky, Cataphote Corporation will distribute Darex AEA in Tennessee, Alabama, Mississippi and Florida.

Carter of Lima Promoted

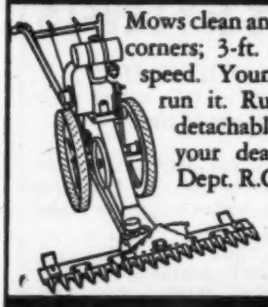
R. G. Carter, heretofore service engineer, has been appointed assistant service manager of Lima Shovel and Crane Division of Lima-Hamilton Corporation, Lima, O. Carter, prior to joining the Lima-Hamilton organization, was with Ralph E. Mills Co. on the Pan American Highway in Central America.

CHECK THE REST—BUY THE BEST...
Proven In Performance.....
Passing The Toughest Tests.
Look to La Crosse for a versatile, maneuverable trailer with Engineered Construction that's easy to maintain SO...
Compare The Cost—
Then Look To La Crosse
Dealers In 48 States
HEAVY DUTY
LA CROSSE
TRAILER CORPORATION
LA CROSSE, WISCONSIN

RELIANCE
CRUSHING, SCREENING and WASHING UNITS
● Up to 2000 Tons a Day ●
Crushers
Elevators
Sweepers
Screens
Wash Boxes
Bins
Pulverizers
Feeders
Spreaders
Kettles
Conveyors
Drag-Lines
"GAYCO"
Centrifugal
Air Separators
UNIVERSAL ROAD MACHINERY CO.
Kingston, N. Y.
Canadian Representatives: F. H. Hopkins & Co., Ltd
340 Canada Cement Co., Montreal, Que., Can

ARIENS
FOR SECONDARY ROAD CONSTRUCTION
AGGMIXER

The swirling, chopping action of these tines does a thorough job of mixing, wet or dry.
Here's equipment designed especially for mixed-in-place construction — to operate in connection with other general purpose equipment. Wherever aggregates are used it thoroughly pulverizes, mixes and aerates aggregates with binder—rapidly and economically. Also ideal for soil cement stabilization. Safe and easy to operate . . . adjustable to any tractor . . . made 4 standard sizes, 4', 5', 6' and 7'. Write for details.
ARIENS COMPANY
BRILLION, WIS.

CUNNINGHAM
MOWER

Mows clean and fast in tight corners; 3-ft. cut; variable speed. Young folks can run it. Rugged design, detachable engine. See your dealer or write Dept. R.O.
Fence Rows
Roadsides
Railroads
Farm Lawns
JAMES CUNNINGHAM, SON & CO.
13 Canal Street, Rochester 8, N. Y. Est. 1838

VULCAN PAVEMENT AND CLAY DIGGING TOOLS
ARE MADE in a complete line of sizes to fit all standard compressed air hammers.
Send for NEW Vulcan illustrated CATALOG today.
TOOLS — THE WORLD OVER — NOTED FOR QUALITY AND DURABILITY
VULCAN TOOL MFG. CO.
QUINCY MASS.

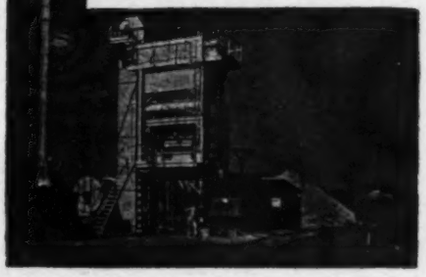
Van de Loo Joins Andrews

J. G. Van de Loo

J. G. Van de Loo, formerly assistant manager of Customer Relations Division of R. G. LeTourneau, Inc., Peoria, Ill., has joined the Andrews Agency of Milwaukee, Wis. as vice-president, effective Oct. 15. During his 12-year stay with the LeTourneau organization, Mr. Van de Loo handled all phases of the corporation's domestic and export advertising—first as art director, copywriter, field photographer, house organ editor and later as assistant advertising manager. He also has spent considerable time in the field, contacting owners and distributors of LeTourneau earthmoving and grading equipment throughout the middlewest, south and east. In his new capacity as vice-president of the Andrews Agency, Mr. Van de Loo will continue to serve his former company, as account executive on the LeTourneau account, which the agency has handled for the past four years. He also will contribute to the other industrial and construction equipment accounts in which the agency specializes.

Syntron Buys New Plant

Syntron Co., Homer City, Pa., has purchased the former H. K. Porter Co. shell plant at Blairsville, Pa., thus adding 100,000 sq. ft. of manufacturing facilities to their main plant at Homer City. Syntron plans to transfer the manufacture of its large, heavy duty vibratory feeders and conveying equipment to Blairsville, which will release space at Homer City, to take care of new products and increased production of its present lines.

PORTABLE ASPHALT PLANTS
High Production—Low Cost

THE McCARTER IRON WORKS, INC.
NORRISTOWN, PENNA.

Shunk Snow Plow and Ice Removal BLADES

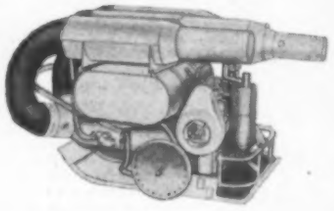
Proved record of superior performance. Made of specially developed steel to withstand severe service conditions.
FOR ALL TYPES AND MODELS OF SNOW PLOWS
Various widths, lengths, thicknesses—flat or curved—standard or special—punched ready to fit your machine.
SHUNK SAW-TOOTH ICE BLADE
Amazingly effective. Thoroughly breaks up and removes heavy, slippery ice and snow formations. Replaces all types of snow plow blades or maintenance units. Write for Bulletin and name of nearest Distributor.
Shunk
MANUFACTURING COMPANY
ESTABLISHED 1854
BUCYRUS, OHIO.

SYNTRON
100% Self-Contained Gasoline Hammer
PAVING BREAKERS

will Save You MONEY and TIME
BUSTING Concrete
DIGGING Shale & Clay
TAMPING Backfill
No air compressor—no hose—no battery box—no cable.
Write for illustrated folder.
SYNTRON CO.
384 Lexington, Homer City, Pa.

CLEARING HOUSE

PORTABLE HEATER SALE IMMEDIATE DELIVERY



Stewart-Warner Portable Powerful 100,000 Btu Gasoline-Burning Heaters complete with Turbine Type Blower and 1½ HP. Air-Cooled Ball-Bearing Engine.

PORTABLE SELF-POWERED MANY PURPOSE HEATER

HEATING buildings, shops, sheds, warehouses, manholes, tunnels, buildings under construction, spot-heating, etc.

PREHEATING engines, tractors, trucks, equipment, etc.

THAWING frozen areas, machinery, pipe lines, tanks, etc.

DRYING plaster, paint, mortar, concrete, etc.

ORIGINAL COST $583.00

SALE PRICE $195.00

Complete with flexible ducts.

Send for literature.

BERNSTEIN BROTHERS
Since 1890

Dept. RS PUEBLO, COLORADO

For Sale and Immediate Delivery:

1—Unused scrubber and washer, manufactured by Eagle Iron Works for the Pioneer Crusher Company; capacity eighty to one hundred tons per hour; trailer mounted on six steel tired wheels; twin paddle type; weight 42,500 lbs.; power unit not available.

1—Snow plow, truck mounted, 1942 Ford; rotary gasoline engine driven; manufactured by Klauer Manufacturing Company; truck has 600 miles use.

Priced to sell.

SUBURBAN EQUIPMENT COMPANY
3105 So. Brentwood Blvd.
Brentwod 17, Missouri

FOR SALE

New WAUKESHA 6-MZAU Power UNITS, 4¼x4¾, 404 cubic inches displacement, complete with house, air cleaner, ring ear, Delco Remy starter, radiator screen, coil and vacuum gauge—less clutch (but clutch could be furnished). 88 Brake H.P. rating at 1,800 R.P.M. These are new units on which we are overstocked. Write for prices.

GEHL BROS. MFG. CO.
West Bend, Wis.

FOR SALE

ASPHALT EQUIPMENT:

Cedar Rapids Hot or Cold Mix Asphalt Plant, 3,000# Capacity, Model E Diesel Operated, Dust Collector, 4 Storage Tanks with Heating Coils 35,000 capacity, 125 horse Boiler complete with all pumps and piping.
Barber Greene Finishing Machine, Hydraulic Control.
1—1,000 gal. Etnyre Distributor, late model, mounted on Diamond "T" Truck.
1—650 gal. Etnyre Distributor mounted on Diamond "T" Truck.
Galion 5-8 ton Tandem Roller, late model.
10-ton Kelly Tandem Roller, converted.
3½-ton Austin Pup 3-wheel Roller.
Ferguson Patch Roller, late model.
9-Wheel Wobble Wheel Roller.
White Tractor and 3,000 gal. Trailer with Coils.
5 Relay Tanks, 800 to 1,000 gal. capacity.
Grace Mechanical Broom Trailer, axle driven.
Chevrolet Flat Bed Truck, 1937 model.
Ford Flat Bed Truck, 1937 model.
20-ton Truck Scales.
Cleaning Machine.

CONCRETE PAVING EQUIPMENT:

27 E. Kochring Paver
4000' 90x8 Road Forms.
800' Lip Curb Forms.
2 Lakewood Finishing Machines 10'x20'.
2 Sub Graders, 10' and 20'.
4 Cement Carts.
1 Cement Scale.
1—50-ton Blaw-Knox Bin and Weighing Batchers.
All equipment located in or near Kansas City, Missouri—excellent condition.

Bowen Construction Co.
1914 Highland Avenue
Kansas City, Missouri
Phone: Victor 4251

FOR SALE

2 only—32 x 27 HAMMERMILLS.

1 only—40 x 36 HAMMERMILLS.

New units of sturdy quality, standard make, immediate delivery. Prices on application.

1 only—10 x 20 R. B. JAW CRUSHER.

1 only 10 x 40 R. B. JAW CRUSHER.

Above are new. Immediate delivery, at exceptionally low prices. Several more available two weeks delivery—prices on application.

1 only—18" x 20' long. Portable all-steel FLIGHT CONVEYOR—mounted on steel wheels. Price, without power (f.o.b. Mpls.) $500. All subject to prior sale.

Write Box 114 Roads & Streets, 22 West Maple St., Chicago 10, Ill.

GENERATOR WANTED

1—Diesel Driven Generator, 220 Volts, D. C. 10 and 20 Kilowatt. Can use high voltage if can use rheostat.

Write to J. A. Laporte
Wilson Boulevard at Barton Street
Arlington, Virginia

HOSE SALE

Brand New 4-Inch

SUCTION HOSE

USES: Portable Pipe Lines; Handling Water, Liquids, etc.; Sewer & Trench Work; Manholes; Suction or Discharge on Pumps; Mines; General Heavy Duty suction work, etc.

DESCRIPTION: New Heavy-Duty 4-inch inside diameter steel-reinforced Suction (or Discharge) Hose complete with male and female fittings. Abrasion-resistant rubber; heavy steel wire reinforcing; plies of heavy fabric. All in 10-ft. lengths complete with fittings. Smooth bore. Couplings are built-in, full-flow, with fixed lug nuts on one end and hand lug swivel nuts on other end; recessed to hold washer in place when hose is disconnected; Eliminates necessity of using wrench.

SALE PRICE is less than ONE-FOURTH the regular NEW PRICE

PRICE per 10-ft. length complete with male and female fittings, brand new. $12.00

BERNSTEIN BROTHERS
SINCE 1890

Pueblo, Colorado Phone 8404

TRANSITS and LEVELS

New or Rebuilt

Sale or Rent

Headquarters for REPAIRS—any make. Factory service. We will also *buy* your old instruments or take them in *trade*.

A complete line of engineering Instruments and Equipment for Field or Office. Write for Bulletin RS-1112.

WARREN-KNIGHT CO.

Manufacturers of Sterling Transits and Levels
136 N. 12th St. Philadelphia 7, Penna.

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With mechanical engineering background in the petroleum, road building and highway machinery and equipment industries. Have broad knowledge of sales methods and have worked with top management as saleman, sales manager and sales promotion director. Available now. Resume and references supplied on request.

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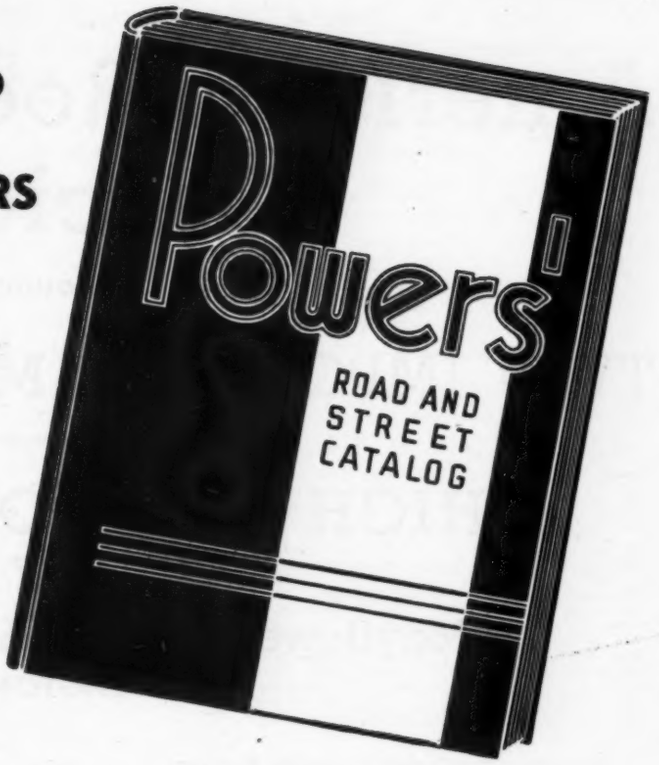

"Catalog is always within reaching distance. Wouldn't be without it!"

A State Highway Engineer made this comment, but practically the same thing has been said by County, City and Federal Engineers; Road and Street Contractors, and Airport Engineers and Managers.

Comments come pouring in from every part of the field in praise of the Catalog and asking to be kept on the list to receive the next edition.

Requests come from the men who plan and design, construct and maintain the roads and streets of the Nation. They are the State, Federal, City and County Engineers; Chairmen of County Boards; Directors of Public Works; Engineers of National Parks and Forests; and Airport Managers and Engineers. They are the Highway and Heavy Construction Contractors who furnish the major market for the purchase of road building equipment and materials.

POWERS' ROAD AND STREET CATALOG offers the most economical and satisfactory method of placing your Catalog information where it will be constantly available to the man "who wants what he wants when he wants it." Here in one compact reference book is all the necessary information on all types of equipment and materials, indexed for easy reference, with names and addresses of nearest equipment dealers.

It is estimated that expenditures for maintenance alone this year will reach the billion dollar mark. To this will be added another billion for new construction and improvements. Step up your advertising for increased buying tempo in this huge market for road building and maintenance equipment and supplies.

AUDITED CIRCULATION — FLEXIBLE CCA

Rate card sent upon request

Write for booklet "What Users and Buyers Want to Know About Care and Maintenance of Equipment."

Gillette PUBLISHING COMPANY
22 West Maple St., Chicago 10, Ill.
NEW YORK • CLEVELAND • LOS ANGELES
SAN FRANCISCO

American Road Builders' Association

announces

TWO IMPORTANT MEETINGS IN 1948

HIGHWAY CONFERENCE

JANUARY 26-28

Mayflower, Statler and Willard Hotels

WASHINGTON, D. C.

An interesting 3-day program! Famous speakers, conferences, forums, reports of technical committees, business sessions, induction of new officers. The capital at the height of the season!

Make your hotel reservations AT ONCE! Congress will be in session at the time. Write, wire or phone for official application blanks today.

1948 ROAD SHOW

SOLDIER FIELD

and

45th Annual ARBA Convention

JULY 16-24

CHICAGO

The 1948 ROAD SHOW will be the largest exposition of equipment, machinery and materials used in the construction of highways and airports ever staged . . . for the first time, heavy machinery exhibited *AND OPERATED* out of doors in an area of over 1,200,000 square feet. 100,000 people will see it.

For information address

AMERICAN ROAD BUILDERS' ASSOCIATION

International Building

Washington 4, D. C.

Inquiry Blank and Advertisers' Index

Check reference to advertisement or to items of equipment or materials on which you wish to receive information. Give your name and address in the space at foot of page (if convenient, please print or use typewriter), detach page and mail to ROADS AND STREETS, Readers' Service Department, 22 West Maple Street, Chicago 10, Ill. We will pass your inquiry along to manufacturers and see that you get desired information promptly.

Check below advertisements on which you wish information on products featured:

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Check other products below on which you wish us to obtain information for you:

AGGREGATE:
- ☐ Bins and Hoppers
- ☐ Conveyors
- ☐ Crushers
- ☐ Portable Plants
- ☐ Screens

BITUMINOUS:
- ☐ Batchers
- ☐ Finishers
- ☐ Distributors
- ☐ Dryers
- ☐ Heaters
- ☐ Plants (central)
- ☐ Plants (travel)

CONCRETE:
- ☐ Batchers
- ☐ Buggies and Carts
- ☐ Finishers
- ☐ Joints, Expansion and Contraction
- ☐ Reinforcement Accessories
- ☐ Metal Road Accessories
- ☐ Mixers (under 1 yd.)
- ☐ Mixers (1 yd. up)
- ☐ Pavers
- ☐ Reinforcing Steel
- ☐ Road Forms (1000' set)
- ☐ Tower
- ☐ Truck Mixers

CRANES:
- ☐ Crawler Mounted
- ☐ Truck Mounted
- ☐ Piledrivers

GRADERS:
- ☐ Blade, self propelled
- ☐ Blade, pull type
- ☐ Blade, under truck
- ☐ Elevating

LOADERS & TRENCHERS:
- ☐ Front-end loader (tractor mounted)
- ☐ Loader, bucket type and belt type
- ☐ Trencher or Ditcher

HAULING EQUIPMENT:
- ☐ Dump Trucks, self-powered
- ☐ Dump Wagons, tractor drawn
- ☐ Flatbed Trailers
- ☐ Other Trucks

PUMPS:
- ☐ Centrifugal
- ☐ Concrete
- ☐ Diaphragm
- ☐ Mud Jacking
- ☐ Piston
- ☐ Wellpoint

POWER UNIT: (Independent)
- ☐ Gasoline
- ☐ Diesel
- ☐ Electric

ROLLERS:
- ☐ Power (Smooth)
- ☐ Pneumatic Tire
- ☐ Sheepsfoot

TRACTORS:
- ☐ Crawler
- ☐ Rubber-Tired

TRACTOR EQUIPMENT:
- ☐ Dozers
- ☐ Power Control Units
- ☐ Rippers
- ☐ Scrapers, tractor drawn
- ☐ Scrapers, self-powered

BUCKETS:
- ☐ Clamshell
- ☐ Concrete
- ☐ Dragline
- ☐ Orange Peel

SHOVELS & DRAGLINES:
- ☐ Crawler (under 1 yd.)
- ☐ Crawler (1 yd. up)
- ☐ Truck Mounted

ROCK DRILLS & AIR TOOLS:
- ☐ Air Compressors
- ☐ Backfill Tampers
- ☐ Clay Diggers
- ☐ Concrete Vibrators
- ☐ Drills, cabel tool
- ☐ Drills, triped and wagon
- ☐ Drills, rock, hand-held
- ☐ Paint Sprayers
- ☐ Paving Breakers
- ☐ Riveters and Chippers

MISCELLANEOUS:
- ☐ Buildings, portable
- ☐ Earth Drills, power
- ☐ Light Plants
- ☐ Lubrication, Service Truck
- ☐ Mowers, Highway
- ☐ Power Saws
- ☐ Soil Stabilizing Equipment
- ☐ Snowplows, rotary
- ☐ Snowplows, v or wing
- ☐ Spreaders, sand or cinders
- ☐ Street Flushers
- ☐ Street Sweepers
- ☐ Welders
- ☐ Cutting Torches
- ☐ Hydraulic Jacks
- ☐ Hydraulic Control Equipment
- ☐ Hand Tools
- ☐ Hoists, derrick type

Be sure to fill in name and address below:

Your Name.....Title or profession.....

Name of your company or governmental department.....

Type of work for which equipment will be used.....

Street Address.....

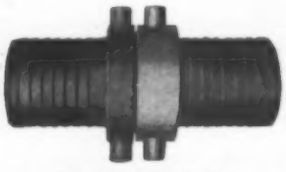
City ..... State ..... County .....

FOUR "KINGS" THAT ARE *Tops* IN QUALITY EFFICIENCY, ECONOMY

"KING"
COMBINATION NIPPLE

With Patented "Cor-O-Zig" Corrugations

Malleable iron or brass. Made to fit straight end hose. Two-way "Cor-O-Zig" corrugations permit easier insertion in hose and assure tighter grip under clamp pressure. Sizes ½" to 10" inclusive.



"KING"
SHANK COUPLING

For Suction and Water Hose

Durable, convenient, economical. Made in three styles—all malleable iron; malleable iron, brass nut; all brass. Uniform in quality, threading and dimensions. Sizes 1¼" to 8", inclusive.

"KING" Single Bolt HOSE CLAMP

"KING" Double Bolt HOSE CLAMP

Made of strong, durable malleable iron. Easy to attach, and can be used over and over again. Tightening provides evenly distributed pressure around entire hose circumference. Double bolt style has quadruple take-up. Full range of sizes.

Stocked by Manufacturers and Jobbers of Mechanical Rubber Goods.

IF IT'S A DIXON BOSS PRODUCT IT'S DEPENDABLE

DIXON
VALVE & COUPLING CO.
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BRANCHES: CHICAGO BIRMINGHAM LOS ANGELES HOUSTON

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Contractors everywhere are more and more relying on Hazard LAY-SET Preformed Wire Rope. They know LAY-SET is the long-lasting, easy-to-handle wire rope that reduces the frequency of machinery shutdowns for rope replacement. Their machines move more dirt, lift more material, when equipped with LAY-SET. It is particularly well-adapted to bulldozers, scrapers, shovels, draglines or any other job that is really tough. Hazard LAY-SET Preformed can boost your production record.

ACCO

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma, Seattle, Bridgeport, Conn.

HAZARD WIRE ROPE DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety

THIS OIL "MAKES" YOUR DRILLS...

- turn in more footage
- require less servicing
- last much longer

You can drill more footage per shift . . . and your drills will last longer, require less servicing . . . when you use Texaco Rock Drill Lubricants E.P.

Texaco Rock Drill Lubricants E.P. are especially made to keep rock drills working at their best. Their "extreme pressure" characteristics are more than ample to protect moving parts even under the severest conditions. They resist oxidation, flow readily, prevent rust and corrosion whether drills are running or idle.

Texaco Rock Drill Lubricants E.P. are approved by leading rock drill manufacturers. Use the grade recommended for your particular drills and operating conditions.

A Texaco Lubrication Engineer will gladly work with you. Just call the nearest of the more than 2500 Texaco distributing plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

KEEP COMPRESSORS EFFICIENT

Assure clean valves, free rings, clear ports and air lines by lubricating with *Texaco Alcaid, Algol or Ursa Oil.* A Texaco Lubrication Engineer will gladly recommend the right one to assure the most efficient, economical compressor operation.

TEXACO

TEXACO Rock Drill Lubricants E. P.

TUNE IN . . . TEXACO STAR THEATRE presents the TONY MARTIN SHOW every Sunday night. • METROPOLITAN OPERA broadcasts every Saturday afternoon.